A CONCISE COMPENDIUM OF CANKAM LITERATURE

VOLUME–I

A(அ) – Au(ஔ)

&

Ka(க) – Kau(கௌ)

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TRANSLATED
by
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THANJAVUR

To Dr.P.Arunachalam, Chief-editor during 1986-87, and to the present chief-editor, Dr.S. Subramanian for their assistance whenever clarifications were sought by the translator.

To Mrs.R.Umamaheswari, who took down the dictation in shorthand and typed out the transcriptions as well as the manuscripts, retyping again and again whenever necessary, without whose enthusiastic and intelligent participation, this English volume would not have attained its present shape.

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LIST OF ABBREVIATIONS

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Ainl. — Ainkuṟunūṟu
Ainl.Ti. — Aiṅkuṟunūṟu Tiraṭṭu
Auvai.D. — Auvai Duraicāmi pillai
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Ciru. — Ciṟupāṇāṟṟuppaṭai
Ti. — Tiraṭṭu
Tol. — Tolkāppiyam
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Poru. — Porunarāṟṟuppaṭai
Matu. — Maturaikkāñci
Malai — Malaipaṭukaṭām
Muru. — Tirumurukāṟṟuppaṭai
Mul. Mullaippaṭṭu
M.A.D. — M.A. Durai Araṅ[illegible]
Ve — Veṇpā
V.V. [illegible]
V.P. [illegible]

tices of the ancient Tamils which are implicit in the Tamil entries in the source-text, are conveyed through English idiom faithfully to the extent possible. Occasionally, the difficulty of conveying the message, main or secondary, has affected the English rendering, making the translated text a little odd or quaint. No one can be more aware of the inadequacy of translation into English than the present writer, for, there can be no perfect translation between languages, especially so, when the subject-matter is so far removed from the present day as Cankam texts are and the source-language happens to be such an ancient and highly developed one as Classical Tamil, with its own peculiar and inflexible literary conventions Comments therefore, on the scope for improvement in particular cases, are welcome

The guidelines adopted by Dr. R. Sarangapani the chief - editor of the first two volumes in Tamil, are as follows·

1. From 2381 poems index cards were prepared giving the nouns from the Cankam classics, as edited by Prof S. Vaiyapuri pillai.

2 As nouns have a pride of place in giving messages, the nouns in the Cankam classics were arranged alphabetically first Of the names of things places, time, parts, quality and action, the first four were largely selected Of the latter, only those which give an idea of the ethos, culture, and ethics of the Cankam period were selected. Some verbal nouns were also selected: adjectives, adverbs and finite verbs do not find a place.

3. Invariably, only words with messages are listed

4. Where rare terms with modifiers had to be included, only the very essential parts were listed.

5. Words indicating tradition, a particular custom or practice were treated as compound words and listed (Aṭitolutal, Araipōtal)

6. Synonymous words do not occur in the same place. For example Acōku, Ceyalai, Pinṭi, though they mean the same tree, are listed separately with their respective occurrences in the work.

7. Nouns occurring in the footnotes to Puranāṉūru, the Patikams prefixed to Patirruppattu, the quatrains appended to Pattuppāṭṭu, the collected poems appended to Patirruppattu Ainkurunūru and Paripātal are included in the list These footnotes are valuable sources of information which are not available within the poems themselves and hence could not be discarded. (e.g.) Puram 61.13; Puram.80 If a word listed in the compendium is not found in the body of the texts, it is to be presumed that it is taken from the footnotes

8. The entries are listed under the head-words in the following order, Puranāṉūru, Patirruppattu, Tirumurukārruppaṭai, Porunarārruppaṭai, Cirupāṇārruppatai, Perumpāṇārruppaṭai, Mullaippāttu, Maturaikkāñci, Neṭunal-

vāṭai, Kuṟiñcippāṭṭu, Paṭṭiṉappālai, Malaipaṭukaṭām, Akanāṉūṟu, Kuṟuntokai, Naṟṟiṇai, Aiṅkuṟunūṟu, Kalittokai and Paripāṭal.

9. In the writing of the messages the exegetical commentaries of the old commentators have been generally followed.

10. Where the word is used in more than one distinct sense, it is listed separately with relevant entries under separate subheads: viz: *Ampal* - 1. A water plant (water-lily) . 2. A musical mode .. 3. A flute .. 4. An astronomical number...

11. If a variant reading for a word is also found to be significant, it is shown as a separate entry in the alphabetical order with entries under it (*Aṅkaṇāṭṭi*, *Alaikaṇāṭṭi*)

Care has been taken to identify the English equivalents for the Tamil names of flowers, plants, trees, birds, animals, fishes, etc. The Tamil Lexicon has been followed by and large as a standard,for the identification. Wherever the English equivalent is clearly identifiable, the English word has been used as such (e.g.) water-lily for *ampal* and glory-lily for *kantal*; kingfisher for *ciral* and quail for *kurumpul*, sirissa for *vakai* and River-portia for *kanci*. Tamil names have been used in transliteration wherever the English equivalents have not been clearly established or not known at all, such as; *uumam*, *ya*, *anril*, *aniccam*, etc.

The transliteration table used in the present work is based on the one used in the Tamil Lexicon.

Lists of names with equivalents, of birds, animals, insects, stars, fishes flowers, trees etc., have been appended to the volume.

A list of abbreviations used in the work with their expansions, is also given for ready reference.

A gloss of literary terms pertaining to the work, explaining the technical terms used in Tamil poetry, is also provided.

K.G. SESHADRI

GRACIAS

To Dr.V.I.Subramoniam, the first Vice Chancellor of Tamil University, for his trust in the present translator when he appointed him to translate this compendium from Tamil to English.

To Dr.S.Agesthialingom, the second Vice-Chancellor for giving him all facilities from time to time.

To Dr.C.Balasubramanian, our beloved Vice-Chancellor with his deep and abiding interest in Cankam Literature, for the encouragement and help in getting this work printed and for his fine foreword.

To Dr P Chinnaian, Registrar for his courtesy and kind help.

To the distinguished bilingual scholars like Dr.Asher, Thiru A.V. Subramanian, Dr.(Mrs.) Prema Nandakumar, Dr.M.O.Durai Arangasamy, Thiru G. Vanmikanatha pillai and last but not least, Thiru T.N Ramachandran, veteran translator, whose responses to our request for remarks on the specimen sent by us have been most encouraging.

To the members of the Review Committee, Thiru T.N. Ramachandran, Thiru T.V.Gopalaiyar, Thiru A.V.Subramanian, and Dr.K.Chellappan who critically went through the translation in '87 and 88', for their useful suggestions for making the translation a near-perfect one

To Panditha Vidwan Thiru T.V.Gopalaiyar, Selector-member of the Review Committee who spared no pains in going through every single entry of the first two volumes in Tamil to mark out the entries for the English translation as per the recommendations of the committee, thus enabling the translator to condense into a single volume the contents of two, without omiting any head word.

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A.C.	—	Apitāṉa Cintāmaṇi
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Malai.	—	Malaipaṭukaṭām
Muru	—	Tirumurukāṟṟuppaṭai
Mul.	-	Mullaippāṭṭu
M.A.D	—	M.A. Dorai Araṅkacāmi
Ve	-	Veṇpā
V.V.		[illegible]
V.P.		[illegible] Palli

TRANSLITERATION TABLE

அ	-	a
ஆ	-	ā
இ	-	i
ஈ	-	ī
உ	-	u
ஊ	-	ū
எ	-	e
ஏ	-	ē
ஐ	-	ai
ஒ	-	o
ஓ	-	ō
ஔ	-	au
ஃ	-	k̲

க்	-	k
ங்	-	ṅ
ச்	-	c
ஞ்	-	ñ
ட்	-	ṭ
ண்	-	ṇ
த்	-	t
ந்	-	n
ப்	-	p
ம்	-	m
ய்	-	y
ர்	-	r
ல்	-	l
வ்	-	v
ழ்	-	ḻ
ள்	-	ḷ
ற்	-	ṟ
ன்	-	ṉ

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SIR KEDARNATH DAS MEMORIAL ORATION

by

J JHIRAD M.D B S (Lond), F R C O G

Interdependence of Obstetrics and Gynaecology

I feel honoured at being invited to deliver this the third "Sir Kedarnath Das Memorial Oration" by the Bengal Obstetric and Gynaecological Society It is a unique honour, not only to be selected to perpetuate the memory of the doyen of Obstetrics in India, but also to feel that your Society should consider me sufficiently senior in experience and standing to class me with those who have given the last two orations I do sincerely thank you, Sir

I am not one of the fortunate ones who was privileged to meet Sir Kedarnath This is a source of sincere regret to me However, the legacy he has passed on is one which each one of us obstetricians can well be proud of Sir Kedarnath was held in high esteem even in international circles Most of his work was devoted to the proper development of Obstetrics, and rightly so, as "preventive obstetrics is preventive gynaecology" Sir Kedarnath had a versatile mind and worked on many a problem in both obstetrics and gynaecology It is evident that he was convinced that the two formed an integral whole and could not be divorced one from the other

Obstetrics may be said to date back to the origin of life on earth, particularly mammalian life in whom the foetus grows within the uterus till it is mature Primitive woman followed the practice, still noticed among the animals, of managing her own delivery and disposing off the placenta We read of midwives in the early days of the Biblical period and it is possible they functioned all over the world The advance of civilisation and concentration of population in towns brought about problems which required better and organised training An interesting account of the Evolution of Obstetrics and Gynaecology was given by Leyland Robinson at the William Meredith Fletcher Shaw Memorial Lecture delivered in 1950 The intrusion of "man-midwives", as he terms them, started with Ambroise Pare in the

are said to have taken the doctorate of medicine in Europe The first English speaking woman to take up medicine was *Dr James Barry* who, in the guise of a man, took her training and graduated from the University of Edinburgh in 1812, and continued to work as a man even rising to be Inspector-General of Hospitals Her sex was discovered only after her death *Elizabeth Blackwell* was the first who conceived the idea of taking up full training in the U S A , but, as none of the medical schools, either in Europe or U S A were open to women, she had to go through almost insurmountable obstacles to gain her objective A kind Quaker friend even advised her to wear masculine attire but she persevered in her feminine garb and won her objective This was 110 years ago, but today every country has medical women in goodly numbers Quite a good few take up, naturally enough, obstetrics and gynaecology

The early training schools were mostly concerned with obstetrics as the high maternal mortality made it imperative to develop better obstetric services The Department catered for the teaching of obstetrics, in which minor medical gynaecology was included, as even at this stage the complete divorce of those allied subjects could not be thought of The development of surgery and particularly abdominal surgery, brought about revolutionary ideas The general surgeon felt it his sole prerogative to wield the knife and even when ovariotomy, etc , were introduced they were considered as the privilege of the general surgeon When it was thought necessary to open special departments of gynaecology these were put under the charge of those with F R C S as a qualification Thus in the early days there were the two departments one under the obstetric physician and one under the gynaecological surgeon who of course did the caesarean sections for the obstetrician This system apparently took long to be overcome in England but in India we were fortunate that from their inception our teaching institutions had the twin subjects under one Head

The term "gynaecology", as defined in the Oxford dictionary, is "that department of medical science that treats of the functions and diseases peculiar to women," and is thus an inclusive term as the commonest function is that of reproduction But old usage of term dies hard and to this day obstetrics is mentioned along with gynaecology, and perhaps it is just as well, if we must not get away from the prime importance of obstetrics which covers more than half the life span of a woman Gynaecology is thus used today in the limited sense excluding obstetrics S R M Reynolds has suggested a new term 'Gynecotokology" to show the close relationship of the two, gyne meaning 'female' and toko is "pertaining to birth

Colleagues of my generation who are present today will recollect how much of the back-breaking gynaecological work of our time was the aftermath of bad obstetrics If some of these, as V V Fs , still crowd up the gynaecological department I expect they hail from rural areas where proper obstetric services are lacking The prevention and minimisa-

16th century The introduction of the midwifery forceps by Chamberlain, early in the 17th century, and Smellie's work, during the 18th century in London, aiming at giving intensive clinical teaching, put the seal on this intrusion A Chair of Midwifery was established at Edinburgh in 1726 Regular instruction was started, at first for midwives, in France and Italy It is about the middle of the 18th century that medical students were admitted for this training The Obstetrician was given the designation of Obstetric Physician or Physician Accoucheur Gynaecology was still in its infancy and consisted only of palliative treatment Spencer Wells and Lawson Tait individually worked up gynaecological surgery It was in 1884 that Lawson Tait helped to found the British Gynaecological Society as opposed to the British Obstetric Society He wrote, "the day has gone by when the treatment of pelvic and abdominal diseases is to be regarded as a mere appendix to the work of accoucheurs Gynaecology and Obstetrics are now happily severed" He worked for the establishment of separate Chairs It was usual to select one with a Fellowship of the Royal College of Surgeons for the Chair of Gynaecology, but this was short-lived As Leyland Robinson says, "Fortunately the attempt to separate gynaecology from obstetrics was doomed to failure, for all the modern advances in medicine and surgery had shown the biological unity of the two subjects" He goes on to show how the British obstetricians and gynaecologists persevered in their plea and saw to it that these were treated as one subject in all teaching institutions The foundation of the Royal College of Obstetricians and Gynaecologists in 1929 gave the final touch to this controversy, one of the objects of this Royal College being to prevent the divorce of obstetrics from gynaecology Similar struggle is noted in the United States of America The incorporation, in 1930, of the American Board of Obstetrics and Gynaecology marks the formal recognition of one combined speciality Dannreuther, writing about the origin, progress and accomplishments of the American Board of Obstetrics and Gynaecology, says, "Having been *conceived* in idealism and *born* into the world as a result of *hard labour*, the Board's further activities proceeded from the Articles of Incorporation which state that the chief purposes of the Board are to encourage the study, improve the practice and advance the cause of obstetrics and gynaecology, subjects which should be inseparably interwoven," and further, "The members of the Board have unanimously believed that the intelligent practice of gynaecology, which is 80% non-operative, depends in a large part upon a thorough knowledge of obstetrics, and vice versa"

Women were almost in clover in Europe in the middle ages Their emancipation dates back to barely 200 years However, there are records of work by "medical women" in the Greco-Roman period and later in Italy and France Esther Pohl Lovejoy puts it succinctly "Century after century medical men were *writing* about gynaecology and obstetrics, while medical women were *doing* the work" Several women

rative procedures have been introduced to meet different problems Ventri-suspension had been considered a necessary treatment for sterility associated with retroversion Happily enough this trend is declining, except in the case of the young aspirant gynaecologist who would like to make a flare by piling up operation lists! Dilatation and curettage has also been given a limited place in cases of sterility, particularly since the introduction of tubal insufflation by Rubin Tubal operations are being advocated in some cases, but here again one wonders how far the claim that there is blockage at the interstitial end of the tube when the rest of the tube is healthy, is correct Even skiagrams can give a fallacious idea in the presence of spasm I feel that every one doing such operations should send a piece scooped out of the uterine cornu for section to prove the block A factor that is often omitted in cases of sterility is the treatment of the ovaries In quite a number of cases of sterility, even if there is a retroversion the ventri-suspension may be considered a secondary operation, the main treatment which relieves the sterility being the wedge resection of the ovaries, where the follicles have not been rupturing One may be justified in suggesting this procedure, even if the uterus is anterior, provided one has proved the non-ovulatory cycles by observation over a few months An alternative treatment for such cases, and reported on favourably, is low dosage X-ray therapy (Kaplan's treatment) to pituitary and ovaries This of course, is a matter of opinion

I have just given a few instances where obstetrics and gynaecology dovetail into one another It is obvious that physiological and pathological conditions of the same organs must go hand in hand the great objective being the preservation of the main functions of these organs and prevention of diseased conditions Congenital and acquired defects, as shown by Shirodkar in the case of the incompetent cervix, can be taken as another instance of the necessity for a close combination of these specialities in one individual

The question would arise, if every one practising midwifery should necessarily be a gynaecological surgeon In our subjects we must allow a place for the general practitioner who will deal with straightforward midwifery with limited scope for vaginal operative deliveries The same person would be responsible for the ante-natal care of the individual and for proper follow-up after delivery to ensure that the function of lactation is carried out satisfactorily to the advantage of the infant and to help the woman to regain her normal non-pregnant state, an achievement which requires much vigilance and guidance Women of the present generation are particularly conscious of their figure This you may think is the physiotherapist's concern However our responsibility as obstetricians towards preventing the aftermath for gynaecology is certainly great Blair Bell had said that 60% of gynaecological work is the result of bad obstetrics This percentage has declined since we have been able to reduce the incidence of puerperal sepsis, but what of the result of septic abortion often brought on by illegitimate means?

tion of the effects of puerperal sepsis has gone a long way towards reducing cases of chronic inflammatory adnexal masses, which usually involved dense adhesions to the parietes, omentum and intestines, needing meticulous care

The affinity of obstetrics and gynaecology can be vividly realised when we as gynaecologists, successfully treat a case of sterility Would any of us like to pass this on to another for care during pregnancy and labour? Do we not feel sufficiently interested in the patient to help her through this ordeal? And are we not interested in that no mishap occurs and that the right procedure, even a caesarean section if needed, is carried out both in the interests of the mother and infant?

Following the course of a normal pregnancy and labour may be considered mundane, but we must remember that *that* was the goal of the treatment we started with when the woman came to us for sterility Some of you will recollect cases where a woman has prolonged sterility after each child, and we are called upon every time to help her to conceive This to my mind is the most illustrative case for close correlation of obstetrics and gynaecology

Most of our work among women is in the child-bearing period and we as gynaecologists are ever vigilant to preserve the child-bearing functional status of their reproductive organs Thus conservative gynaecological surgery, as sponsored by Victor Bonney is held constantly in our minds Gynaecology and obstetrics may be considered to move in a cycle each bringing up the other in its wake Congenital abnormalities may form an illustration Atresia in the genital tract may have to be overcome to give an easy passage to menstrual fluid and to sperms Acquired atresia, the result of difficult labour, will involve ingenious gynaecological procedures to help possibility of future conception Operations for prolapse, urinary fistulae and other like conditions, aim at restoring the woman to her normal state with possibility of conception in future Ectopic gestation brings in special problems It is difficult in some of these cases to know where obstetrics ends and gynaecology begins and vice versa Next, take the cases where pregnancy is complicated by an ovarian or uterine tumour Must the gynaecologist be called in by the obstetrician to deal with these tumours? It is a recognised convention that, if during a pelvic operation the appendix is required to be removed, the gynaecologist carries on The general surgeon is not summoned at this stage The same person who is competent enough to deal with major obstetric problems, including abdominal section, must be competent enough to deal with whatever else presents during the operation It is essential that a gynaecological surgeon should be well versed with general abdominal surgery, particularly intestinal surgery, as often one may be confronted with dense intestinal adhesions in the pelvis The recently introduced operation of exenteration for carcinoma of the cervix requires a thorough knowledge of the surgical anatomy of the bladder and rectum, not to speak of the pelvic vascular and nervous systems To go back to cases of sterility various ope-

guiding the woman with the right type of exercises, instructing her to avoid constipation and undue strain, will go a long way to prevent prolapse and stress incontinence A condition easily preventable is *chronic retroversion* in a multipara—a displacement associated with menorrhagia, leucorrhoea and chronic back ache This is definitely an aftermath of neglected post-natal care, which has allowed a heavy subinvoluted uterus to fall back and bring about this train of symptoms Careful guidance during the early puerperal period, regular exercises including knee-chest exercises for the first month, avoidance of strain and constipation and, most important of all, a timely post-natal examination, say at the end of the first month will help to detect this condition and give an opportunity for early and permanent cure by conservative methods I have often helped these women to conceive and then ensured proper post-natal care, as detailed above, so as to give a permanent cure A number of unnecessary ventri-suspensions can thus be prevented Similarly, early lesions of the cervix and vaginal walls can be looked for soon after labour and at post-natal examinations, and proper treatment instituted so as to prevent chronic conditions, particularly of the cervix, which if neglected may form a precursor to carcinoma of the cervix

Castello and Montgomery published an interesting paper in 1935 on "The Management of the Prenatal and the Postnatal Cervix' They emphasised the need for prenatal treatment of cervical lesions to prevent puerperal infection and post-natal follow-up for detecting and treating cancer To quote them, To precisely the same degree that prenatal treatment of the infected cervix is necessary for the prevention of puerperal infection, so also is post-natal restoration of the cervix required for the prevention of cervical cancer ' They advocated periodic examination Tompkins in the same year, gave the "Results of Treatment of Benign Lesions of the Cervix Uteri by Cauterisation, Trachelorrhaphy, Sturmdorf s Operation and Amputation of Cervix and stated that the incidence of carcinoma of the cervix was very low in these cases, 2 out of 611 H S Crossen, writing in 1933 remarked that *results of treatment* of carcinoma of the cervix had got to a standstill, because it was symptomless in the early stages and advice was often sought too late This statement is perhaps true even today Crossen suggested prophylaxis by 1 Early treatment of irritation of the cervix 2 Regular follow-up 3 Leading questions about leucorrhœa etc , even if patient comes for other complaints 4 Routine pelvic examination even if patient has not come for symptoms pertaining to the pelvic organs 5 Yearly examination between 35 and 55

The routine examination of the cervix has exercised the minds of gynaecologists for at least the past 30 years Hinselmann introduced the Colposcope in 1928 This was followed soon after by Schiller advocating the Lugol s Iodine test and biopsy of suspicious areas The credit for the latest development goes of Papanicolaou Cytological diagnosis is now being worked up at all centres and is proving very helpful

Do you recollect cases of sterility which give a history of having had abortion procured in the early years of marriage? — cases so difficult to help. These are the ones where the cornual ends of the tubes are blocked, as shown by Green-Armitage. Is it not our responsibility to try to educate the population against such practices? In the early years when family planning was being advocated and contraceptives were being advised, cases would come to us, either on their own or worse still brought y general practitioners, cases who ad conceived and felt that, as part f family planning, abortion should be induced! The incidence of abortion has been variously worked out as 15-25% of deliveries, but even this may be an understatement, for a number of cases do not come to our notice and history-taking with our ignorant population is so unreliable. Apart from the natural causes, it is surmised that quite a large number are either self-induced or procured, and these are the ones which end in disaster. If the woman survives the ordeal, she has probably already got damage done which prevents further pregnancies. Venereal infections seem fortunately on the decrease and thus the incidence of gonococcal infection of the adnexa has declined.

We, as obstetricians, must take up post-natal work seriously and develop it so as to ensure a return of the parturient woman to the normal non-pregnant state. We have managed to make ante-natal clinics very popular all over the country, albeit the heavy attendance at these is largely due to the fact that women find it more convenient to have confinements at hospitals, and they realise that they must book early to ensure admission for confinement. I have already dwelt at length elsewhere on re-orientation of ante-natal work so as to make it really educative both for the patient, medical student and the pupil-midwife, and thus incidently, prevent many a complication of pregnancy and labour. Health visitors and medical social workers keep vigilant watch over the attendance at ante-natal clinics, but they would need to persevere with their efforts at popularising the post-natal clinics. We on our part should see that a fairly senior person from the Unit attends these clinics to attract better attendance. This is certainly uphill work but well worth the reward, if we are truly interested in preventive gynaecology. A very interesting paper was written on *"The Prevention of Prolapse of the Uterus and Vaginal Walls following Childbirth"* by Margaret Salmond and Gertrude Dearnley in 1935, giving an account of follow-up of 580 patients, cases collected from hospitals attended by students and midwives, cases of general practitioners and private cases of specialists. They noted that there were fewer cases of prolapse and lacerations in the private cases and they implied that poor nutrition probably played a prominent role in bringing about this laxity of tissues. Moreover, premature and strong bearing-down efforts, long before the onset of the second stage, and attempts at forceps delivery even before full dilatation of the cervix seemed responsible for a large percentage of these defects. A careful follow-up in the immediate puerpe-r and during the first six weeks,

Periodic examination in the cancer age is a responsibility of the gynaecologist, a practice which it is incumbent on every gynaecologist to popularise among his patients. Fortunately, the general population is getting cancer conscious and a number of these can be easily influenced to attend periodically. Such prophylactic work is our responsibility and should find a prominent place in our teaching of undergraduates and postgraduates. Apart from this, every woman needs to be instructed as to the symptoms she should not neglect.

This brings me to the subject of *teaching our speciality*. We are all agreed that every aspiring medical person should have a good grounding in obstetrics, as reproduction is the commonest function, and affection, if you wish to put it that way, in the childbearing period of a woman. The percentage incidence of neoplasm of the generative tract is fortunately much lower as compared to conception. As already stated a high percentage of gynaecological work is the aftermath of bad obstetrics and hence good obstetrical care will go a long way towards reducing this incidence, leaving the gynaecologist to deal mostly with neoplasms and certain functional disturbances. It will be conceded that some neoplasms, as carcinoma of the cervix, and some of the functional conditions are possible to be either prevented or at least detected in their incipient stages so that complicated operative procedures can be prevented. Sufficient time of the student should be devoted to the study of obstetrics and hence, I feel it is essential that the teacher spends time over giving training in normal ante-natal, intra-natal, immediate puerperal and post-natal work, emphasising all along the preventive aspect. The concept of the management of ante-natal work, as I have already stated, has to be completely re-orientated to see that the clinic is educative both to the patient and the student. Following of labour cases again has to be worked out with a view to getting the prospective doctor to be fully in alignment with the case he is to conduct, rather than come in just in time for the second stage. Follow-up of mother and infant in the lying-in wards is just as important. Post-natal clinics can afford much scope for training in preventive gynaecology, and thus need to be popularised among the patients and students. I have noted with dismay that very few obstetricians make it a point of impressing the need for a follow-up on the patients confined by them. Our responsibility does not end with seeing the woman through her confinement, but one may say that, once we have won the confidence of the patient by the way we managed the labour, we are in a position to impress on her the need to continue under supervision.

It has been conceded by all that six months should be given for our speciality in the undergraduate training, and of these, two-thirds of the period should be devoted to obstetrics. The aim of undergraduate training is to prepare a good general practitioner who can attend to the general ailments in the population, and at the same time carry out prophylactic examinations and propaganda. Every general practitioner is called in some time or the other for labour cases, particularly if there is

MENSTRUATION DURING LACTATION

A Clinical Study

by

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Lactation is believed to reduce the fecundity of women who sometimes refrain from weaning their babies in the belief that by so doing they are less liable to become pregnant Haddon's Observations on Women of Eastern Islands of Torres Strait (1908) show that with these people prolonged nursing tends to reduce the size of families and that single lactation may be continued for 3 years In India also it is generally believed that lactation reduces the chances of conception, hence prolonged nursing is quite prevalent Gopalan made a field study of lactation performance of women of different socio-economic and cultural groups in the Nilgiris District of South India A study of poor women revealed that lactation in these was maintained well beyond the end of first year

It is also a common observation that while reproductive function may remain in abeyance during lactation in some women, others may have no period of amenorrhoea Some conceived during this period of amenorrhoea, occasionally 3 to 4 children are born with no menstruation in between

Amenorrhoea is usually regarded as physiological during lactation but it is not a constant phenomenon Janney considers that amenorrhoea in nursing mothers seems to be a "safety valve mechanism", apparently akin to the mechanism of amenorrhoea in debility where the organism is subjected to unusual demands In the average mother nursing is an added demand and he claims support from the fact that menstruation during lactation seems to be re-established earlier in physically strong women than in others Similarly, Hoffman considers that since lactation and gonadal function constitute a drain upon the nutritional resources of the organism, and both require the hormonal support of the anterior pituitary and other endocrine glands, it is possible that lactational amenorrhoea represents an effort of the organism as a whole, and endocrine system in particular, to conserve the resources for the purpose of milk production

would have a bearing on some of our problems Howard Taylor (Jr) has said, "The evolution of obstetrics and gynaecology away from a speciality anatomically defined, towards one based on a broad idea is a great accomplishment, but the abandonment of tangible means of defining our frontiers has made us particularly susceptible to invasion by other disciplines Co-operation with them has indeed become imperative" He ends up his address with the statement, "The union of obstetrics and gynaecology is an article of faith with most of us, but it has produced requirements in knowledge and skills that stretch the human capabilities to their utmost Between the extremes of cancer of the cervix and the toxaemias of pregnancy lies most of medicine"

This gives much for us to ponder over the preparation for, and particularly the practice of, our speciality Ancillary aids will always be welcome Our speciality, particularly as it comprises a fundamental aspect of human physiology, viz, that of reproduction, closely correlates with preventive and social medicine, and thus places a great responsibility on us for good obstetric work, which will go a long way towards preventing many a gynaecological ailment This realisation can only come if the two subjects are considered as a whole forming one speciality, taught and practised as such

I admit I have not given out new ideas which some of you may have looked forward to at this Oration, but I am convinced that not enough can be said on the subject of correlation of these twin subjects, as also on the prevention of unnecessary suffering to women The modern trend of young gynaecologists is towards complicated operative work which certainly is fascinating for the operator but eventually the greater achievement to our credit should be *the prevention of the need for such operative procedures* If this idea goes home to some of my young friends present this evening and to a larger number who may read this in the journal, I shall feel it was worth my while coming over for this Oration Thank you

References

1 Adair Fred Obstetrics & Gynaecology, 1940
2 Berkeley Commyns J Obst & Gyn B E, XXXVI, 701, 1929
3 Castello Mario A and Montgomery T L Amer Jour Obst & Gyn, XXX, 37, 1935
4 Crossen H S Amer Jour Obst & Gyn, XXVI, 686, 1933
5 Dannreuther W J Amer Jour Obst & Gyn, LXVIII, 15, 1954
6 Green-Armitage V B Jour Obst. & Gyn B E, LXVI, 32, 1959
7 Lovejoy Esther Pohl Women Doctors of the World, 1957
8 Mengert W F Amer Jour Obst & Gyn, LXXVII, 697, 1959
9 Reynolds S R M Physiological Basis of Gynaecology and Obstetrics
10 Robinson Leyland Jour Obst & Gyn B E, LVIII, 50, 1951
11 Salmond Margaret and Dearnley Gertrude Jour Obst & Gyn B E, XLII, 44, 1935
12 Shaw William Fletcher Jour Obst & Gyn B E, LXI, 557, 1954
13 Taylor Howard Jn Amer Jour Obst & Gyn, LXXVI, 931, 1958
14 Tompkins P Amer Jour Obst & Gyn, XXX, 369 1935

The following data was obtained from all the patients

1 Age of the patient
2 Parity
3 Income per capita per month
4 Date of delivery or abortion
5 The nature of delivery
6 Breast feeding
   (i) Frequency and regularity
   (ii) The time of starting artificial feed and its frequency
   (iii) Time of weaning
7 Menstruation Date of first period after delivery or abortion, subsequent regularity, and change in menstrual flow or pain

Results

The investigation included women in whom the pregnancy had terminated after varying periods of gestation

An analysis of the cases investigated is presented in Table 1

TABLE 1

Analysis of Cases Investigated

Total number 452	Postpartum 422	Lactating 390	Menstruating 282
			Amenorrhoeic 108
		Non lactating 32	Full-term 23
			Premature 9
	Postabortum 30		Early abortion 9
			Late abortion 21

Data on 282 lactating women who had commenced menstruation during the period of investigation are given below

1 Age	Between 20 to 30 years	70%
2. Parity	Primipara	17%
	Multipara	83%
3 Income per capita per month		
	Rs 20 or less	42.2%
	Rs. 21-60	36.6%
	Rs 61 or more	21.2%
4. Lactation	Mean duration of lactation	13.5 months

Mckeown and Gibson (1954 England) in a study of menstruation in 1943 post-partum women in Great Britain concluded that menstruation was fairly effectively suppressed in the early months of lactation How long should lactation amenorrhoea be considered physiological and, if prolonged, when should it be considered pathological, cannot yet be decided as reports from different workers and countries vary Pundel in Belgium (1951) defined the period of physiological post-partum amenorrhoea in a lactating woman as one that lasts not more than 4 months Stoeckel, in Germany (1941), observed that lactation amenorrhoea rarely extends beyond more than 4 months

Data on reappearance of menstruation after delivery vary considerably among Indian women The individual findings by various workers are far from unanimous In a recent report of a study on lactation period in Indian women conducted in Bombay Peters et al (1958) stated "In India lactation period [illegible] than a year is usual and often the child is nursed until a new pregnancy occurs Fertility is high in India and repeated periods of prolonged lactation represent therefore a considerable portion of the reproductive years in life of an Indian [illegible] They found that in the [illegible] Indian women investigated [illegible] of post-partum menstruation [illegible] Only one-third [illegible] by the end of [illegible] more than [illegible] the child [illegible] after 12 [illegible]

ed in Ramnagiam, a South Indian village, as a part of 'Attitude Survey on Family Planning' by World Health Organisation (1954), out of 296 lactating and amenorrhoeic women, 63% had children less than one year old, 21% nursed children between the ages of 13-18 months, in 14% of the women amenorrhoea continued though their children were 19-24 months In the remaining 3% the amenorrhoea had lasted for more than 24 months

These two studies, one in a South Indian village and the other in labour class women of Bombay, suggest that the long period of lactation is not an uncommon practice and resumption of menstruation is delayed in India More studies in different parts of India and in different socio-economic groups are required before definite conclusions can be drawn Neither of these study groups are representative of India

Material

The menstrual cycles of 452 women were studied during post-partum and postabortum period The patients were attending the gynaecological outpatients' department and the postnatal clinic of Lady Hardinge Medical College Hospital New Delhi Some of these women were first interrogated in the early post-partum period and others were first seen several months after previous delivery or abortion The investigation conducted during an 11-month period, from 1st August 1957 to 30th June 1958 included 390 lactating women of whom 282 were menstruating and 108 were amenorrhoeic at the time of completion of the study

Out of 282 lactating women, 136 were still nursing their babies at the end of the period of study. Therefore the duration of lactation could be known in the remaining 146 women only.

TABLE 2

Duration of Lactation in 146 Women

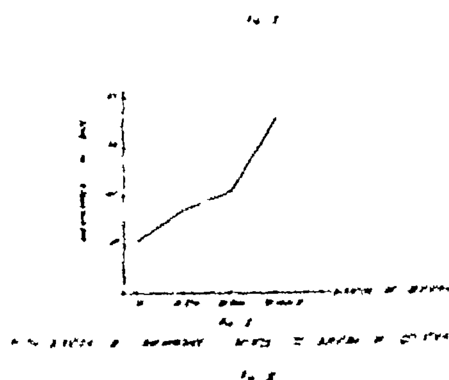
Duration of Lactation	Number of cases	Per cent of women
1-3 months	12	8.2
4-6 months	19	13.0
7-9 months	16	10.9
10-12 months	36	24.7
More than 1 year	63	43.2

Influence of Social Status on Duration of Lactation

Jenney claims that menstruation during lactation seems to be re-established earlier in physically strong women. However, social status involves a number of complex variables, viz. income, nutrition and knowledge about breast feeding. It is difficult to claim that a woman of good social status has a good physique. Though the nutritional status of woman is not always proportional to the level of the income *per capita*, it is presumed that women of higher income group can take diet at least of adequate calories, if not of good quality. The duration of lactation in different income groups is shown in [illegible]

Commencement of menstruation in Non-lactating Women

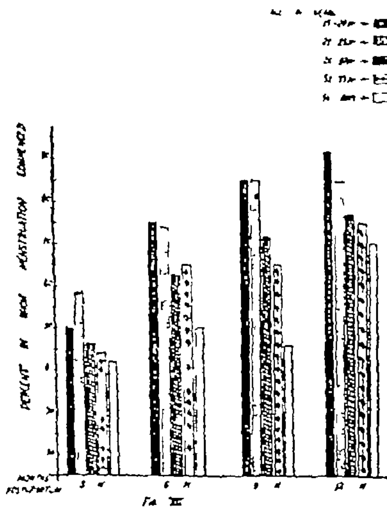
Resumption of menstruation was studied in 58 non-lactating women. The mean duration of post-partum and postabortal amenorrhoea in the non-lactating women in relation to the period of gestation is shown in Fig. 1. In the full-term non-lactating

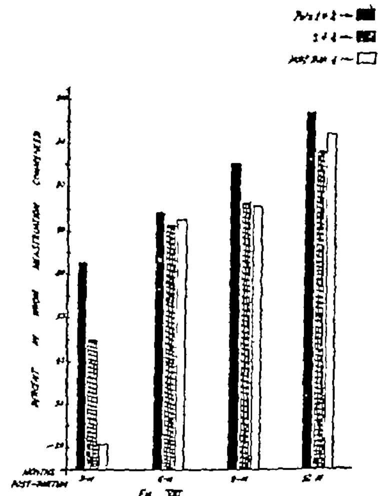


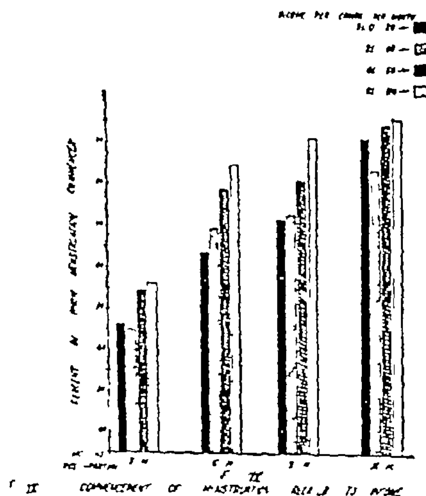
women (23) the mean duration of amenorrhoea was 58 days.

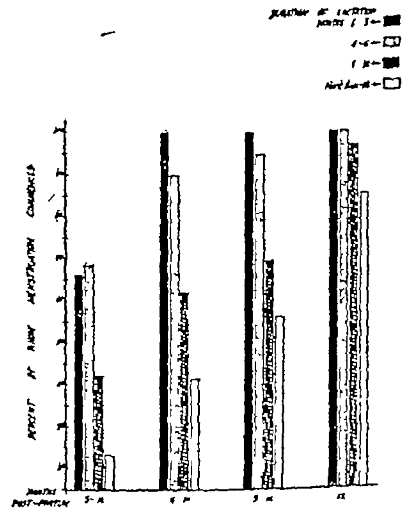
Commencement of Menstruation in Lactating Women

The commencement of menstruation during lactation was recorded in 282 women and is shown in Fig. 2. The mean duration of amenorrhoea in the lactating women was 5.27 months with standard deviation of [illegible].55. Only 41.7[illegible] had amenorrhoea of lactation for longer than 3 months. It was found that 74.[illegible] were men-









Influence of Partial Weaning on Lactation Amenorrhoea

Mckeown and Gibson (1954) concluded from the work of 943 women that menstruation returns earlier if the child is partially weaned They explained that it is the stimulus of suckling that inhibits the cycle Early return of menstruation in partially weaning mothers may be due to reduction in the stimulus of suckling which may be voluntary or may result from the use of artifical feeds to supplement inadequate flow The return of menstruation related to the method of feeding is shown in Fig 11 Those who started the artificial milk supplementary feeds in the first month postpartum were considered as partially lactating (87 women) whereas those who started the supplementary feeds

their babies and 56 8% of the mothers who partly weaned their babies Correspondingly, 36 8% of *fully lactating and 56 4% of partially lactating mothers had started menstruation by the fourth month postpartum in the present study* Sharman also found that partly lactating women menstruate earlier than the fully lactating women

It is also noticed from the present study that the duration of postpartum amenorrhoea is longer if supplementary feed is started at a later date (Fig 6) In those women who started supplementary feeding later than 6 months, the mean duration of amenorrhoea was 34 5 weeks, whereas in those who started within first 3 months, mean duration of amenorrhoea was 22 3 weeks If there is such quantitative relation, correlation could be better understood if more uniform criteria for quantitative evaluation of breast feeding could be obtained Pickles has pointed out that any investigation on problem of human lactation is hampered by lack of convenient and quantitative methods Mckeown and Record (1957) found that the period of 'full breast feeding' is the best index of ability to lactate in any large series of patients in whom it is not practical to assess the adequacy of milk supply "Full breast feeding" means that no artificial milk is given to the baby However, small quantities of artificial milk may be given from the beginning, yet there may be no reduction in frequency of breast feeding This is true in hospital class of Indian women who allow their babies to suckle at any time of the day without any regularity Such a nursing mother, though not included in "fully lactating" and "full breast feeding" groups, may be no different from others in these groups, if we consider stimulus of suckling to be an important factor in inhibiting menstruation

"Time of weaning", though quite a convenient criterion, is not a reliable index either It is determined more by the ideas and notions of the family and customs of the society rather than by the sufficiency and insufficiency of milk Lactation is quite commonly prolonged though artificial milk might have been started early Often lactation is terminated only when next conception occurs or when next conception is recognised if it occurs during the lactation

Between the non-lactating and fully lactating mothers, there is a wide range of the so-called 'partially or partly lactating' mothers Any quantitative relationship of lactation and menstruation cannot be investigated unless some uniform criterion for assessing lactation is used by all the workers

Period of Lactation in India

Any reports on menstruation during lactation from Europe and America are bound to differ from similar data collected from women in India as duration of lactation varies in different countries Douglas (Great Britain 1950) found average duration of lactation to be 5 5 months, those who had given up nursing the child within 14 days were excluded Only 53% of mothers lactated at the end of second month and 6% at end of tenth month

The period of lactation is prolong-

months Pundel (1951) from Belgium defines the period of physiological amenorrhoea in a lactating woman as one that lasts not longer than 4 months Pekham (1943) studied the records of 2885 nursing mothers who had been delivered in the white and coloured wards of Johns Hopkins Hospital, Baltimore, U S A , and found mean duration of amenorrhoea in white to be 3 09 months and in coloured 5 5 months In the present series of 390 lactating mothers, the date of commencement of menstruation was available in 282 The mean duration of amenorrhoea was found to be 5 25 months with standard deviation of 4 5

Commencement of Menstruation before End of Lactation

Though the menstruation is fairly effectively suppressed in the early months of lactation, considerable number of patients start menstrual flow during lactation as was pointed out by Williams as early as 1917

Out of 282 lactating mothers in the present study in whom the menstruation had commenced, 81% had started the menstrual flow before weaning This compares well with 80% reported by Ehrenfest, and 81% reported by Delee It does not differ much from 71 4% of 2885 lactating mothers investigated by Pekham However, in other studies, smaller proportion of women are reported as having commenced menstruation during lactation Out of 2834 patients studied by Sharman at the end of 9 months after delivery, 57% of primiparae and 73% (average 64 8%) were reported to have menstruated before weaning Mezer and Goldstein reported 55%, while both Robinson and Booth reported 41% Still lower percentage of 22 was reported by Mckeown and Gibson These authors themselves explained the observation, that the smaller proportion, i e 22% of their cases, started menstruation during lactation, was in part due to interpretation of lactation as the period of breast feeding without artificial supplements In their series only 26% of the mothers fed their babies more than four months, while in the present group under study 60 9% fed more than 9 months In Pekham's group 47 0% breast fed their babies more than 9 months All of Robinsons 413 cases continued lactation at least 8 months

These wide differences in duration of lactation in different groups studied by different workers may explain the differences in the reports on menstruation during lactation The higher figures in the present study, i e 81%, menstruating during lactation can be accounted for by the long duration of lactation, mean duration of lactation being 13 5 months Menstruation is relatively more effectively suppressed during the initial months of lactation, later the flow starts in spite of it

Influence of Partial Weaning

The studies by Sharman (1951) and Mckeown and Gibson (1954) clearly indicate that menstrual flow is early in 'partly lactating' than in 'fully lactating', but later than in non-lactating Mckeown and Gibson found that, at 4 months postpartum, menstruation had commenced in 39 8% of the mothers who breast fed

pregnancy and nursing mothers and also spacing of children, multiparity may not impair the nutrition and thus prolong the amenorrhoea

Summary and Conclusions

1 Out of 390 lactating women, in 282 the date of commencement of menstruation was available, remaining 108 still had amenorrhoea at the end of study Out of 282 81% commenced menstruation while still lactating This high figure is accounted for by the long duration of lactation in the women studied
2 The mean duration of lactation was 13 5 months
3 The mean duration of amenorrhoea was found to be 5 25 months
4 Duration of amenorrhoea increases as duration of lactation increased Those who weaned their babies early had early menstruation
5 Duration of amenorrhoea was longer if no supplement milk was added to baby's feed than if artificial milk in addition to breast milk was given to the baby Greater proportion of partly lactating mothers started menstruation earlier than that of fully lactating
6 Earlier the artificial milk supplement was started, earlier the menstruation commenced
7 In lactating mothers the duration of amenorrhoea increases with increase in age
8 In lactating mothers the duration of amenorrhoea increases with increase in parity
9 In lactating mothers the duration of postpartum amenorrhoea decreased as the income per capita increased. This is presumed to be due to better nutritional status of high income group
10 In the absence of lactation the mean duration of amenorrhoea after full-term delivery was 58 days, after premature delivery 42 days After gestation of 13-27 weeks it was 38 days, after gestation of 6-12 weeks amenorrhoea was 31 days Duration of gestation seems to determine absolute period of amenorrhoea which may be maintained further by lactation

References

1 Attitude Survey on Family Planning Final Report on Pilot Studies in Family Planning 1954 W H O Reg Office S E Asia
2 Booth M Yale J Biol Med 8 215 1935
3 Delee and Greenhill The Principles and Practice of Obstetrics 1959, 9th edition W B Saunders Co Philadelphia
4 Douglas J W J Obst & Gyn Br Emp 61 824 1952
5 Ehrenfest Quoted by Sharman 1915
6 Final Report on Pilot Study on Rhythm Method of Family Planning Govt of India 1958
7 Gopalan C Ind J Med Research 46, 317, 1958
8 Grunberg V Wien Klin Wchsner 60 498, 1948

ed in India as is borne out by the recent reports (1956, by Rao) of a study of the nutritional habits of 2100 children attending the Government General Hospital, Madras All had been breast fed upto one year, 79% upto 18 months, 59% upto 2 years only 41% had nutritional supplements such as milk before one year However, the duration of lactation in urban and rural areas is likely to be different A comparative study of the duration of lactation in women of Ramnagaram (rural) and Lodi Colony, Delhi (Urban), showed the difference in lactation habits of two groups of the population

At Ramnagram 35% of women lactate even when the child is 3-4 years old In contrast, it is exceptional for Lodi colony women to lactate after the child is two years old Hardly 10% of the mothers in Lodi colony, Delhi, nurse their babies after they are two years old, while 50% stop nursing by the time the child completes its first year

In the present group (Delhi), the mean duration of lactation was 13 5 months, 60 9% nursed their babies more than 9 months, 43% more than one year and 10% more than 2 years

Influence of Income

In the present study the duration of lactation amenorrhoea was definitely related to income The income considered was the income per capita per month The mean duration of amenorrhoea decreased with rise in income, e g from amenorrhoea of 26 7% weeks in lowest income group of Rs 0-20 it was reduced to almost half, i e 14 weeks in income group of Rs 80-100 There were very few patients in income group above Rs 100

Influence of Age

In the present study definite relation was found between the age of the patient and postpartum amenorrhoea (Fig 3) Duration of amenorrhoea increased with age Compared to the mean amenorrhoea of 19 5 weeks in those under 20, it was almost double, i e 37 4 weeks, in groups of cases with age above 35 years The upward trend of the curve is uniform (Fig 3)

Influence of Parity

The duration of amenorrhoea during lactation shows a definite rise with increase in parity (Fig 4) The difference in percentage menstruating in different groups at different intervals postpartum according to parity (Fig 8) is most marked at 3 months postpartum, gradually decreases at 9 months, and at one year there is little difference (Parity means number of viable children)

As early as 1909 Pinard stated that menstrual function becomes re-established later in multiparous than in primiparous women Mckeown and Record found no relation with parity Sharman's study suggests that menstruation returns earlier in multiparae than in primiparae, contrary to the present data

High parity in India mean frequent conceptions with shorter intervals between pregnancies which constitute a severe drain on the nutrition of the mother It may be that in Britain and America where special attention is paid to the nutrition of

EVALUATION OF VAGINAL CYTOLOGY FOR ESTIMATION OF HORMONAL FUNCTION

A Study of Sterility in Female

by

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The plight of a childless wife has *to be seen to be realised* This age-old problem of barrenness rates high among the causes of deep unhappiness in marriage

According to Mazer and Israel, the etiologic factors requiring investigation in cases of sterility are

(1) *Factors in Male* Recognisable by thorough sexual history and the semen examination

(2) *Factors in Female*

(a) Grossly recognisable pelvic conditions, e g tumours and infections, usually discovered by a careful gynaecological examination

(b) Factor of insemination of cervix-evaluated by Huhner's postcoital test

(c) The tubal factor, tested by Rubin's Insufflation test

(d) *The endocrine factor,* which included abnormalities of the menstrual rhythm and anovular menstruation.

It was decided to establish the extent of information acquired by cytology regarding the endocrine factor in cases of sterility to begin with, for the obvious advantages this technique had over endometrial biopsy, in being a simple, inexpensive, painless and rapid procedure, which could be repeated a number of times harmlessly, besides completely avoiding any operative procedures, or hospitalisation of the patient

Aims and Object

This work was, therefore, taken up to

(1) explore the potentiality of vaginal smear as an aid to study the endocrine factor in sterility which included the detection of anovulatory cycles and the nature and degree of hormonal dysfunction

(2) illustrate in a uniform manner, the most significant and representative types of exfoliated cells, as the basis for such a study

Paper read at The Tenth Annual Conference of the Indian Association of Pathologists, held at Poona on 18-20 Dec. 1959

9 Haddon A C Reports of the Cambridge Anthropological Expedition to Torres Strait, 1908

10 Hoffman J Female Endocrinology, Chap 10, 1st edition 1944, W B Saunders Co, Philadelphia

11 Hytten F H Brit Med Jour, Vol 1, p 844, 1447, and 1410, 1954

12 Janney J C Medical Gynaecology, 1945, Saunders, Philadelphia

13 Levine R Discussion on Udesky's Paper, 1950

14 Mckeown T, Gibson J R J Obst Gyn Br Emp, 61, 824, 1954

15 Mckeown T and Record R G J Endocrin, 51, 410, 1957

16 Mazer C and Goldstein L 1932, W B Saunders Co, Philadelphia

17 Mirchandani J J Thesis for M D, Obst & Gyn, 1959, Delhi Univ

18 Peter H, Isreal S and Purshottam Feit and Steril, 9, 134, 1958

19 Pekham C H Bull Johns Hopkins Hospital, 54, 186, 1934

20 Pickles V R J Obst Gyn Br Emp, 60, 301, 1953

21 Pinard A Ann Gyn Obst, 6, 721, 1909

22 Pundel J. P Quoted by Peters H, 1951

23 Rao P T Ind J Child Health, July, 1957

24 Robinson M Lancet, 1, 66, 1943

25 Sharman A J Obst & Gyn Br Emp, 58, 44, 1951

26 Stander H J Williams Obstetrics, 9th edition, 1945, Appleton Century, New York

27 Stoeckel W Leherbuchder Gynaecologic Leipzig, 1945

28 Udesky I C Am J Obst & Gyn, 59, 842, 1950

29 Wallace L R Jour Agri Sc, 1947-1948

30 Williams J W Obstetrics, 1917, Appleton Century, New York

9 Haddon A C Reports of the Cambridge Anthropological Expedition to Torres Strait, 1908
10 Hoffman J Female Endocrinology, Chap 10, 1st edition 1944, W B Saunders Co, Philadelphia
11 Hytten F H Brit Med Jour, Vol 1 p 844, 1447, and 1410, 1954
12 Janney J C Medical Gynaecology, 1945, Saunders, Philadelphia
13 Levine R Discussion on Udesky's Paper, 1950
14 Mckeown T, Gibson J R J Obst Gyn Br Emp, 61, 824, 1954
15 Mckeown T and Record R G J Endocrin, 51, 410, 1957
16 Mazer C and Goldstein L 1932 W B Saunders Co, Philadelphia
17 Mirchandani J J Thesis for M D, Obst & Gyn, 1959, Delhi Univ
18 Peter H, Isreal S and Purshottam Fert and Steril, 9, 134, 1958
19 Pekham C H Bull Johns Hopkins Hospital, 54, 186, 1934
20 Pickles V R J Obst Gyn Br Emp, 60, 301, 1953
21 Pinard A Ann Gyn Obst, 6, 721, 1909
22 Pundel J P Quoted by Peters H, 1951
23 Rao P T Ind J Child Health, July, 1957
24 Robinson M Lancet, 1, 66, 1943
25 Sharman A J Obst & Gyn Br Emp, 58, 44, 1951
26 Stander H J Williams Obstetrics, 9th edition, 1945, Appleton Century, New York
27 Stoeckel W Leherbuchder Gynaecologic Leipzig, 1945
28 Udesky I C Am J Obst & Gyn, 59, 842, 1950
29 Wallace L R Jour Agri Sc, 1947-1948
30 Williams J W Obstetrics, 1917, Appleton Century, New York

(3) find out whether as much information could be obtained by making the technique less cumbersome for the patient and the clinician, specially by reducing the number of smears to be collected in a menstrual cycle Most workers in this field insist on examining series of smears collected daily or at least on alternate days throughout the menstrual cycle But most of the clinicians were of the view that this was impractical as the majority of the patients attending the general hospitals could neither spare the time nor afford the expense of attending the hospital too frequently from long distances in the city of Bombay, nor had the clinicians enough time and staff to collect, so often, so many smears from each of these numerous cases, and nor could our average patient with her limited education and ability be trained and relied upon to collect clean, uniform smears and fix them without drying etc at home

Method, Material and Plan of Work

Method consists essentially of

1 Collection of cells
2 Fixation and staining
3 Microscopic examination

1 *Collection of Cells* All cytologists agree that the diagnostic accuracy greatly depends upon the technique of cell collection The site of collection is equally important The cotton applicator for swabbing the vagina, although it gives a fine thin smear, with cells collected only from the site chosen, was avoided and aspiration of cells by a glass pipette was preferred as the former often disorganised the cell pattern, while the latter preserved the natural clumping and grouping of cells, which is so important for diagnosis, and, moreover, the pipette sucked up a representative sample from the pool of exfoliated cells lying in the upper third of the vagina Best smears were obtained with a perfectly dry pipette as drops of water caused cytolysis Following fundamental steps were, therefore, stuck to for obtaining a correct vaginal smear

(i) Collection with a clean, dry pipette, from upper third of vagina, gently sweeping the walls with its tip, while releasing the rubber bulb

(ii) Deposition of material upon the slide, without touching it, and, if thick, rapidly spreading it with air blown from the pipette

(iii) Immediate immersion of smear into the jar containing fixative, without drying the smear

2 *Fixation and Staining* The fixative used was a mixture of equal parts of ethyl alcohol and ether Staining follows fixation Shorr's full trichrome technique, using the different dyes separately, was adopted

3 *Microscopic Examination* In the study of smears following points were carefully attended to

(i) recognising more characteristic cell types

(ii) observing the degree of aggregation or dispersion of cells

(iii) noting cellular outline, clear, indistinct, folded, etc

(iv) doing differential counts of various types of epithelial cells, to construct cytological curves, if necessary

Minimum of 7 fields were examined and a minimum of 400 cells were

This (Table I) shows that all these women were of child-bearing age The largest number was between 20 to 30 years of age According to Mathews Duncan, maximum fertility is seen in the women from the age 20 to 25 years and it declines thereafter In this series, however, the largest number of patients fell in this group Age factor is important in sterility cases specially after 35 years of age Only 2 cases belonged to this category

51 cases complained of dysmenorrhoea The pain was of all degrees, congestive as well as spasmodic Majority, among the irregular, had scanty flow lasting from one to two days All amenorrhoeas were secondary and varied in duration from 3 months to 6 years

Tables II and III reveal the general pattern of menstruation among the irregular cycles, as being one of scanty flow along with long intervals between cycles, suggesting ovarian deficiency Nearly as common were normal flow and normal intervals, while excessive flow and short intervals were seen in a few There was no case of scanty flow with short cycles, and only one case with profuse flow and occasional longer intervals Two cases had very irregular cycles one of them menstruating thrice a month or once in three months Both had profuse flow

TABLE II

Interval between Menstrual Cycles

Short interval (less than 28 days)	10 cases
Longer interval (more than 30 days)	36 "
Normal interval (28-30 days cycle)	39 "
Very irregular interval	2 "

TABLE III

Menstrual History		Total cases	100
Amenorrhoea	Scanty flow	Excessive flow	Normal flow
13	32	14	41

TABLE IV

Pelvic Findings

Nature	Number of cases

ed, weak progesterone activity was considered as the cause

In contrast, a proliferative phase smear was a clean, leukopenic smear with isolated and discrete predominantly flat precornified and cornified cells having distinct and unfolded outlines, containing cytoplasmic granules suggesting well marked or good estrogen activity

Even with all these clear cut criteria, it must be realised that each individual has her own hormonal level and pattern, and smears vary from case to case accordingly Hence an objective study of complete history and examination of the case along with the series of smears collected during a cycle alone give the most reliable information eliminating the errors of interpretation

Study

Results of smear examinations are shown in Table VII which indicates activity of estrogen and progesterone including ovulation A glance at the table will reveal that more cases occur as one goes from the left to the right side, and an *increasing* departure from normal hormonal activity and ovulation occurs as one looks from above downwards 34% cases showed normal estrogen activity, 12% increased and 48% various degrees of (from mild to absent) estrogen activity Cases which are labled as absent estrogen activity showed cells from deeper layers of the vagina, viz the parabasal cells, indicating that the vaginal epithelium was atrophic and estrogen was almost entirely lacking Occasional parabasal cells here and there are encountered in a number of smears and are not significant It was experienced that dependence on pink (acidophilic) or blue-green (basophilic) colour of the cytoplasm alone for estimation of cornification was not a reliable criterion while the compactness or pyknosis of the nucleus was quite a reliable indication of the maturity of the cell and the estrogen index, as a standard for interpretation with staining techniques specially other than the one by Papanicolaou Graham and McGraw too share this view

Twelve out of 19 women with normal menstruation had normal estrogen activity and 8 out of 11 on whom it was possible to give opinion had ovulatory cycles in this group None except 4, showed deficiency of estrogen, and these 4 too had a very mild deficiency Three showed hyperestrinism and 3 anovulatory cycles

None in the group of normal flow with shorter intervals had estrogen deficiency and all had ovulatory cycles

In the profuse flow group, only one case each, in short interval and longer interval groups, showed absent estrogen activity One was a patient of secondary sterility 40 years of age and had developed bleeding at 2-3 days' interval since one month, after life-long history of more or less normal menstruation This was probably a case of menopausal irregularity The other was also a case of secondary sterility aged 32 years, with two months' cycles and excessive flow

In scanty flow group, out of 30 reported cases, 20 showed estrogen deficiency of various degrees and 17 had anovulatory cycles out of 24 reported cases (By reported cases is

TABLE VI

Classification of Smears

Cell types				Interpretation of estrogen activity		
Majority of cells	Majority of rest of the cells	Type	Group	In post-menstrual & follicular phases	In pre-ovulatory ovulatory and post-ovulatory phases	In luteal & pre-menstrual phases
Cornified mostly		mature smear	5	increased	normal	increased
Cornified	pre-cornified		5-4	normal	normal	increased
Precornified	cornified		4-5	normal	normal	increased
Precornified mostly			4	normal	moderate	normal
Precornified	intermediate		4-3	moderate	decreased	normal
Intermediate[a]	pre-cornified	intermediate smear	3-4	moderate	decreased	normal
Intermediate mostly			3	decreased	decreased	moderate
Intermediate[a]	parabasal		3-2	decreased	decreased	decreased
Parabasal	intermediate	atrophic	2-3	decreased	decreased	decreased
Parabasal mostly			2	absent	absent	absent

a and/or small squamous cells like cornified or precornified cells but the size is small, i e 35-50 microns

meant those cases in which it was possible to give an opinion on the smears)

Out of 100 cases, it was not possible to report on estrogen activity in 6 cases, the causes of failure were

1 Cells masked by erythrocytes in smears, rendering grouping impossible (3 cases)
2 Cells masked by leucocytes (1 case)
3 Cells masked by leucocytes and erythrocytes (1 case)
4 Thin smear, i e material insufficient for opinion (1 case)

Smears showing erythrocytes were collected during the menstrual phase The large number of leucocytes suggested presence of inflammation No 3 contained endometrial cells suggesting proliferative phase Even in some of these, one could make a guess of estrogen activity but since confirmation was not possible, these were reported as "no opinion possible"

In the amenorrhoea group, 9 out of 13 cases showed estrogen lack and 7 had anovulatory cycles out of 12 reported cases

By cytological study 40% of cases had anovulatory cycles, 7% showed weak progesterone activity and 25% had normal ovulatory cycles Thus 32 out of 72 cases in which an opinion was possible had ovulatory cycles

Twenty-four (66%) out of 36 reported cases with scanty or no menstrual flow had anovulatory cycles

In 28 *cases it was not possible* to give an opinion regarding ovulation These also include cases in which no opinion on estrogen activity as well could be given

On analysis the causes of failure were

(1) The available smears belonged to the first half of the menstrual cycle At this stage it is not possible to forecast progesterone activity or ovulation (21 cases)

(2) Smears masked by erythrocytes and/or leucocytes (4 cases)

(3) Very thin smears with number of cells insufficient for opinion (2 cases)

(4) Smears showing basal and parabasal cells but masked by large number of leucocytes making opinion very difficult (1 case)

A study of the causes of failure of cytology makes it clear that these can be prevented easily, making cytological examination quite a useful and more successful investigation A majority of these causes (25 cases of the smears of first half of the cycles and menstrual smears) was inherent in the condition of maximum convenience to the patient and the gynaecologist, by not asking the patient to present herself on a required day, but collecting a smear on the day she is required to be present by the clinician and the hospital

Sterility and Cytology

Table VIII reveals that 35 cases (49%) showed estrogen lack, 25 (35%) normal and 11 (16%) increased estrogen activity in 71 reported cases of primary sterility 32 (57%) had anovulatory and 24 (43%) ovulatory cycles out of 56 reported cases 5 (9%) showed weak progesterone action

TABLE VII

Menstruation and Cytological Patterns

Flow	Profuse	Profuse	Profuse	Profuse	Normal	Normal	Normal	Scanty	Scanty	Amenorrhoea	Total
Interval	Short	Normal	Longer	Irregular	Short	Normal	Longer	Normal	Longer		
Total cases	5	6	1	2	5	21	15	12	21	13	100
Oestrogen level											
Normal	—	3	—	1	4	14	4	5	—	3	34
Increased	1	1	—	—	1	3	2	1	2	1	12
Mildly decreased	2	2	—	—	—	4	1	1	6	2	18
Markedly decreased	—	—	—	—	—	—	7	4	7	6	24
Absent	1	—	1	—	—	—	1	1	1	1	6
No opinion	1	—	—	1	—	2	—	—	2	—	6
Progesterone / Ovulation											
Normal	—	1	—	1	5	5	3	3	4	3	25
Weak progesterone level	—	—	—	—	—	3	2	—	—	2	7
Non-ovulatory	4	2	—	—	—	3	7	5	12	7	40
No opinion	1	3	1	1	—	10	3	4	4	1	28

cycles was almost equal in primary (57%) and secondary (58%) groups, it was less than half (25%) in relative sterility group

The study thus points to estrogen deficiency as a significant factor in the relative sterility cases

Pelvic Findings and Cytology

Table IX showed that 4 out of 5 cases of bulky uterus had estrogen lack, while 11 out of 19 cases of small uterus showed normal or increased estrogen activity Fifty per cent in the former group had anovulatory cycles, while 80% in the latter had anovulatory cycles Since small uterus was found in nearly one-fifth of the cases, these are significant revelations

In 'cystic ovary' cases, 10 out of 14 had normal or increased estrogen levels and 72 7% had anovulatory cycles, suggesting high incidence of failure of ovulation, when ovaries were palpable clinically

Ovulation and Cytological Curves

Various cytological curves quoted in literature were obtained in the present study by plotting cornified cell percentages from the differential counts done on the vaginal smears

Photograph 1 represents the eutrophic curve of a normal ovulatory cycle, with cornification peak by the 15th day and thereafter a decline till the lowest mark reached by 22nd day of the cycle The endometrial biopsy showed secretory phase

Photograph 2 represents the hypotrophic-cyclic curve where cyclic variation of hormones is reflected and the curve looks similar to the eutrophic curve with peak by the 14th day and lowest mark by the 24th day But the percentage of the cornified cells remains lower than that in the eutrophic curve, particularly towards the middle of the cycle Though D Allende and Orias, Watchel and others have called this an anovulatory curve, in this case the study of 6 serial smears collected from her during one cycle showed a weak estrogen activity followed by a normal progesterone action The endometrial biopsy showed early secretory phase It therefore, appears that these types of curves do occur in ovulatory cycles as well

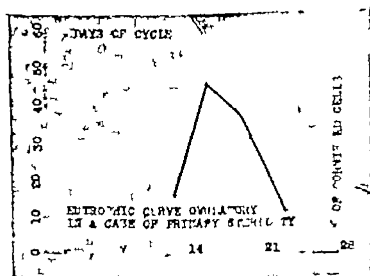


Fig 1

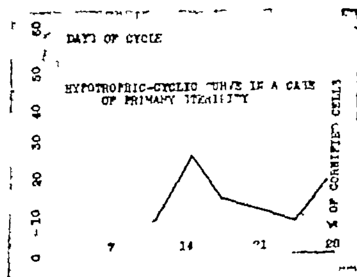


Fig 2

TABLE VIII
Cytological Patterns in Sterility Types

Sterility			Primary	Secondary	Relative
Total cases 100			75	17	8
ESTROGEN ACTIVITY	Increased		11	1	—
	Normal		25	7	2
	Mildly decreased		14	3	1
	Markedly decreased		19	2	3
	Absent		2	3	1
	No opinion possible		4	1	1
PROGESTERONE ACTIVITY	OVULATORY	Normal	19	4	2
		Weak progesterone action	5	1	1
		Anovulatory	32 (57%)	7 (58%)	1 (25%)
		No opinion possible	19	5	4

Fifty per cent of the cases of secondary and 5 cases (70%) of the cases of relative sterility showed estrogen lack while 6% of secondary sterility showed increased estrogen activity So while the incidence of deficiency was equal in primary and secondary sterility, it was much more in the relative sterility group There was no case of hyperestrinism, in relative sterility, while the incidence in secondary and primary group was 6% and 16% respectively Thus hyperestrinism appears uncommon in secondary and relative sterility cases

While the incidence of anovulatory

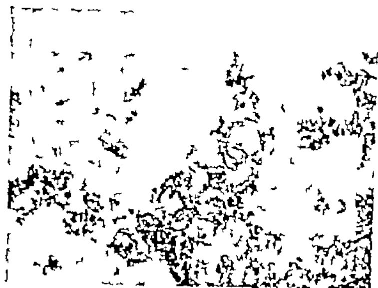


Fig 3

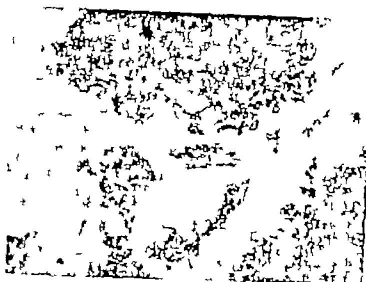


Fig 4

Photo-micrograph 3 taken during the follicular phase in this case suggests weak estrogen activity with cells not very discrete, cell borders not very distinct and majority of the nuclei still vesicular, but in contrast photomicrograph 4 shows marked clumping and curling of cells and a characteristic dirty smear of normal progestational phase, very much similar to that seen in ovulatory cycles This case was of a primary sterility with hypomenorrhoea Here, therefore was a case where the endometrium was not ripely primed due to estrogen lack, when progesterone activity supervened

Photograph 5 represents the hypotrophic-acyclic curve Where smears presented a monophasic picture with cornified cells remaining uniformly low (5% and below) without practically any variations throughout the cycle It is easy to understand that these are markedly hypoestrinic and anovulatory cycles with strikingly monotonous and dirty smears throughout This was a case of primary sterility with oligomenorrhoea

Photograph 6 represents the dystrophic curve with persistently high cornification throughout the second half of the menstrual cycle No progesterone action was seen in 8

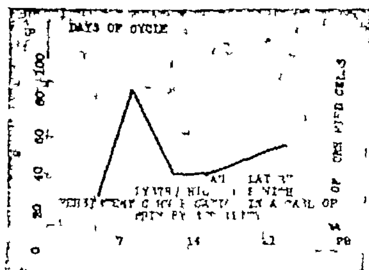


Fig 5

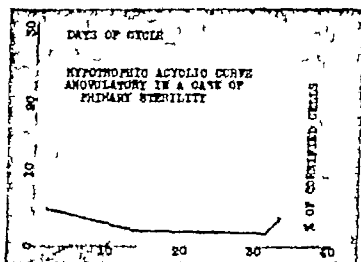


Fig 6

STERONE ACTIVITY

TABLE IX

Pelvic Findings and Cytology

findings		Increased	No opini possible	Estrogen Activity				Progesterone Activity			
								Ovulatory		Anovula-tory	No opinion
				Mild decrease	Marked decrease	Absent	No opinion	Normal	Weak		
Bulky uterus	5	—	1	2	1	1	—	2	—	2 (50%)	1
Hypo-plastic uterus	19	3	8	2	3	3	—	2	1	12 (80%)	4
Cystic ovary	15	3	7	2	1	1	1	3	—	8 (72 7%)	4

Fifty per cent of the cases o
daiy and 5 cases (70%) of th
of relative sterility showed
lack while 6% of secondary
showed increased estrogen
So while the incidence of de
was equal in primaiy and se
sterility, it was much more

serial smears collected from her. The endometrial biopsy showed advanced proliferative phase. This was a case of primary sterility with hypoplastic uterus and polymenorrhoea.

As an example of the many interesting cases studied, we might mention smears taken from a case of primary sterility with secondary amenorrhoea, who used to have occasional spottings at the interval of 3-4 months, or menstruated only with injections of progesterone. All injections were stopped. 8 smears collected at intervals were studied. The first smear taken 3 months and two days after her last menstrual period showing mainly discrete intermediate cells in a clean smear very much like a follicular phase with weak estrogen activity. The picture changed till the smear taken 14 days later looked dirty and showed mild curling and clumping of the cells, suggesting very weak progesterone activity. 10 days later she spotted scanty menstrual flow spontaneously. Here, therefore, was a case of amenorrhoea which though it showed cyclic changes, these were very weak and just sufficient to cause only scanty menstruation after long intervals, thus proving gross hormonal deficiency.

Cytology therefore promptly reveals hormonal imbalance. This study effectively shows that all degrees of estrogen activity, from high to totally insufficient, occur in cases of sterility with any menstrual history or clinical finding. Merely a hypoplastic uterus or scanty or absent menstrual flow does not mean estrogen deficiency. The unwarranted use of hormones is rampant in gynaecological practice. Very frequently patients stated that they had taken innumerable estrogen tablets and all sorts of injections of different hormones, over long periods.

By this method patients can easily be classified into

1	Smears of hyperestrinism	No estrogen therapy indicated
2	Smears of normal estrogen activity	
3	Smears of mild estrogen lack	Estrogen therapy indicated
4	Smears of marked estrogen lack	
5	Smears of ovarian failure as shown by presence of deep cells (basal and para-basal cells)	Estrogen indicated urgently and in larger doses

In the last group the clinician should not wait for the biopsy report, as it is clearly quite late already. In the rest, any information on the estrogen levels will give the gynaecologist a definite idea about the ovarian function. Once he has classified his patients as above, the treatment becomes a simple matter. Even the dose to be given can be controlled and the patients would be treated most rationally. Follow-up of smears, gradually returning to the normal or otherwise, would also be a very useful guide to the clinician and of great benefit to the patient consequently.

In the present series, cases were thus followed up with smears after administration of estroprogyn by intramuscular injections.

Photo-micrograph 7 shows the smear from one such case, a 30 year

(2) The slides were also stained by an alternative full Trichome technique of Shorr as described by De Allende and Orias The procedure in this method is as follows

1 Fix immediately, avoiding drying, in equal parts of 95 per cent alcohol and ether, for at least 2 minutes, longer fixation is not harmful
2 Pass through 80 per cent, 70 per cent, 50 per cent alcohol and distilled water, dipping the slide about 10 times in each
3 Stain 1½ minutes in Harris's hematoxylin.
4 Dip twice in distilled water and 10 times in a weak solution of ammonia (0 5 c c in 200 c c of distilled water)
5 Stain 1 minute in the Biebrich Scarlet-Orange G solution Wash rapidly in distilled water
6 Leave in the mordanting solution 1 minute Wash in distilled water
7 Stain 2 minutes in the Fast Green solution
8 Without washing, place directly in 1 per cent acetic acid for ½ minute
9 Wash in distilled water and pass through 50 per cent, 70 per cent, 80 per cent, 95 per cent, absolute alcohol, xylol, 1-4 hours and 2 changes, mount in Canada balsam or an equivalent cement, with a cover slip

Fixation

The fixative used in both the techniques was a mixture of equal parts of ethyl alcohol and ether Fixing property of this solution becomes impaired with passage of time as the high volatility of ether makes preservation of original 1 1 ratio of ether-alcohol fixative difficult It is therefore desirable to prepare fresh solution of ether and alcohol before use Generally, slides were kept in the fixative overnight and stained next morning This procedure ensures proper fixation and adequate adherence of smears to the slide

Results

The Papanicolaou's technique gave consistently good results However, the dyes available locally sometimes did not dissolve fully even in alcohol and thus the actual strength of staining solution was always less than that prepared after filtering it Therefore, the time interval for which a smear is immersed in that particular dye solution, in each dye, had to be modified We believe that each worker has to find out for himself and standardise the suitable time intervals for immersion of smears in different solutions of the stains prepared by him as the time fixed by any other laboratory will often be found unsuitable The time schedules mentioned by us gave satisfactory results, with our dyes The orange 6 dye proved to be a delicate one and was easily washed out of the cells by alcohol It is therefore advisable to rinse the smear only momentarily in alcohol after the orange 6 stain and before immersing the smear in EA 36

It became clear soon that considerable quantities of alcohol were needed in the Papanicolaou's technique

procedures have not been very popular There are a number of difficulties that confront a worker who wishes to introduce and establish these techniques in the clinical laboratories, for example, (i) the considerable quantities of alcohol needed for this purpose, (ii) the non-availability of suitable stains locally, (iii) the unsatisfactory working of the staining solutions prepared in laboratory, etc

Aim and Object

It was, therefore, the first intention of the authors to try and find out a less expensive and more simplified procedure for the pathologist and the clinician, to help and encourage them to establish this as a routine technique It had, therefore, to be a method which satisfied two main criteria, viz, easy availability and low cost, so as to be within the reach of an average clinical laboratory

Materials and Methods

To establish and learn these staining techniques, random smears were collected to begin with and Papanicolaou's technique was tried out His original technique has been modified by numerous workers in various countries It became apparent that to the Papanicolaou's technique, which was referred to by various authors, many of them had introduced numerous minor modifications which, according to the author concerned, gave better results

The technique followed by us is as follows The preparation of various solutions is appended at the end of the article

(1)

95% ethyl alcohol	10 dips	1 change
50% ethyl alcohol	10 dips	1 change
Distilled water	10 dips	3 changes
Harris haematoxylin	1½ minutes	
Distilled water	rinse well	3 changes
Alcoholic ammonia	45 seconds	
75% ethyl alcohol	10 dips	2 changes
95% ethyl alcohol	10 dips	2 changes
Orange G-6	3 minutes	
95% ethyl alcohol	1 dip	2 changes
EA 36	3 minutes	
95% ethyl alcohol	2 dips	2 changes
Absolute ethyl alcohol	2 dips	2 changes
Xylol	1-4 hours (until cleared)	2 changes

Mount in neutral Canada balsam

2 A 0 5% solution of Bismarck Brown in 95% distilled ethyl alcohol.

3 A 0 5% solution of Eosin Yellowish in 95% distilled ethyl alcohol

These solutions are kept in the refrigerator They keep well for about 2 months From these stock solutions EA 36 for daily use is prepared as follows

Light Green S F	27 c c
Eosin Yellowish	27 c c
Bismarck Brown	6 c c
Acid phosphotungstic	0 12 gm
Lithium carbonate (saturated aqueous solution)	1 drop

This solution is filtered into a coplin jar When the stain is not being used the covered coplin jar is kept in the refrigerator, the stain is prepared freshly once a week

III Harris Haematoxylin

Haematoxylin	1 gm
Ammonium or potassium alum	20 gms
Distilled water	200 c c
Mercuric oxide	0 5 gm

1 gm of haematoxylin is dissolved in 10 c c of distilled absolute ethyl alcohol This is mixed with a solution of 20 gms of alum in 200 c c of distilled water Bring this mixture to boiling then add 0 5 gm of mercuric oxide Boil until a dark blue colour appears Then cool in water bath

This stock solution is kept in a coloured bottle at room temperature, away from the light 60 c c is put into a coplin jar This is filtered daily before it is used Fresh haematoxylin is added every few days to keep the level in the staining jar high It does not have to be renewed completely more often than once or twice in a year (depending on the number of slides processed)

IV Alcoholic ammonia is prepared by adding 3 c c of ammonia to 97 c c of 70% alcohol

Appendix II Preparation of Shorr's Stains

Haematoxylin

To two parts of the stock solution of Harris's haematoxylin, add one part of saturated solution of ammonia alum (15 grams of ammonia alum 4 c c of glacial acetic acid, 100 c c of distilled water) Add an excess of ammonia alum crystals Filter from time to time as used Each batch of staining solution will suffice for about 1000 smears The solution does not deteriorate during use

2 Biebrich Scarlet—Orange G

Biebrich Scarlet (water soluble)	1 gram
Orange G	0 4 gram
Distilled water	100 c c
Glacial acetic acid	1 gram

3 Fast Green

Fast Green	0 75 gram
Distilled water	100 c c
Glacial acetic acid	0 75 gram

4 Mordant

The difficulties and inconveniences in obtaining and storing absolute alcohol, its cost, and the limited quantities that could be made available, led to a search for an alternate method of staining which would give comparable results and yet be less expensive and require less alcohol Moreover staining by Papanicolaou's technique with locally available dyes was not as satisfactory as with the imported dyes of American make which could be obtained only with difficulty due to import restrictions, and cost more Only thus by making it less expensive and complicated for the clinician and the pathologist was it possible to establish cytology as a routine investigation Therefore Shorr's trichrome technique as described by De Allende and Orias was adopted This procedure needs much less alcohol and all the dyes are locally available The colour-differentiation of the different cells was good and permitted the fullest estimation of the hormonal influences on the epithelium Staining of the nucleus was generally better in the Papanicolaou's which was therefore preferable for diagnosis of malignancies, where the nuclear detail is so important For the endocrinology of the female sex organs Shorr's full technique is quite adequate De Allende and Orias Cheema and Malkani among others have used this technique The authors believe that a simple but equally efficient staining procedure utilising less costly and more easily obtainable materials should have wider use

Shorr's single stain technique was found inferior for permanent preparations or for research work It can, however, be used for a routine outpatient laboratory for rapid diagnosis and when smears are not required to be stored permanently

Summary

Procedures of staining for exfoliative cytology are described in detail Their comparative utility is discussed Shorr's full trichrome technique should have wider use for hormonal work as it is much less expensive, and quite satisfactory Papanicolaou's technique is ideal for all cytological work but is expensive as it requires larger quantities of alcohol

Appendix I Preparation of Stains for Papanicolaou's Stains

I Orange G-6 (OG-6)

Prepare a 0 5% solution of orange G in 95% distilled ethyl alcohol Add phosphotungstic acid 015 gm

We prepare 200 c c of this stock solution which when stored in the refrigerator keeps well for 3 months

From this stock solution 60 c c are put into a coplin jar and used for daily staining The covered coplin jar with the stain is kept in the refrigerator when not in use It is renewed once a week, i e the used stain is discarded and the coplin jar is filled with another 60 c c from the stock solution

II EA 36

Prepare 200 c c each of the following solutions

1 A 0 5% solution of Light Green S.F. Yellowish in 95% distilled ethyl alcohol

Equal parts of a 5 per cent solution of phosphomolybdic acid and a 5 per cent solution of phosphotungstic acid, both in distilled water

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References

1 Cheema T S J Obst & Gyn Ind, 4, 296-306, 1958

2 De Allende I L C and Orias O Cytology of Human Vagina, H K Lewis & Co, London, 1950

3 Malkani P K and Sharma S J Asso Med Women Ind, 3, 71-79, 1958

4 Papanicolaou G N Atlas of Exfoliative Cytology, Harvard University Press, Cambridge, Mass, 1954

Group III
Abnormal

1 Leukoplakia True
Mosaic
Ground
Encircling gland mouths
2 True erosion abrasion of squamous epithelium
3 Abnormal transformation zone glassy yellow appearance
4 Adaptive vascular hypertrophy corkscrew and comma shaped blood vessels

Group IV
Cancer

I shall limit my discussion here to one of these abnormal findings

'Leukoplakia' is a word of Greek origin and means a 'white plate' It is not a clinical diagnosis but is a descriptive term which is used by the colposcopist to denote a white or yellow-white area of increased epithelial opacity which does not take the iodine stain Hinselmann (1953) has described four degrees of abnormality found associated with cervical leukoplakia ranging from a slight increase in basal cell activity to pronounced activity with hyperchromatosis, mitosis and budding into the underlying stroma He originally regarded all these grades as precancerous This statement was not, however, corroborated by his own later findings or by those of others Limburg (1958) states that about 10% of the cases of the various forms of leukoplakia are associated with preinvasive and invasive cancer

Leukoplakia of the cervix was practically unheard of before the introduction of colposcopy With the use of this method it has been shown to be relatively frequent Wespi in 1949 wrote that among 3736 women examined by colposcopy, 7 1% showed the presence of cervical leukoplakia

Leukoplakic areas generally appear in the transformation zone or the area where the borderline fight between squamous and columnar epithelium is continually going on Three types of leukoplakia have been described

1 True leukoplakia in which there is a raised white area which may or may not be visible on naked eye examination

2 Mosaic or 'field' leukoplakia or 'zoning' which appears as a raised area consisting of polygonal or round yellow-white zones separated by fine red lines

3 Ground leukoplakia or 'base' which is characterized by a depressed yellow-white area with fine red stippling

Each of these three varieties of leukoplakia becomes well demarcated after the application of 3% aqueous acetic acid while after painting the cervix with Lugol's iodine solution the leukoplakic area becomes very distinctly stencilled out against the mahogany stained normal epi-

* Iodine 4 gms potassium iodide, 6 gms, distilled water, 100 ml.

Papanicolaou smear or by both methods was made in 124 out of 605 cases (12%) Of the 92 cases of leukoplakia, 20 (22%) were associated with trichomonas

Gonorrhoeal Infection and Leukoplakia

In 189 cases, endocervical smears were taken as a routine, stained by Gram's method and examined for the presence of gonococci The smears showed gonococci in 20 cases (11%) Smears were taken as a routine in 52 cases showing leukoplakia and, among these, 4 (8%) showed the presence of gonococci

Wespi (1949) comments on the high incidence of gonorrhoea in his cases of early and surface carcinoma and mentions the possibility of inflammation being a predisposing factor in the development of cervical cancer Carter and others (1956) state that of 275 cases of carcinoma in situ, about 65% were associated with cervicitis

Follow-up of Cases

In 32 women, who had leukoplakia of the cervix at the initial examination, colposcopic examinations were repeated after from 1 month to 15 months In 9 of them the leukoplakia had regressed while in 23 it persisted In 27 women with leukoplakia at the first examination, smears were repeated after from 1 month to 7 months In 14 cases the smears remained the same, in 7 the atypia had regressed while in 6 cases the smears showed increased atypia

In 26 cases showing colposcopic findings class I or II at the initial examination, a re-examination from 1 month to 16 months later showed the presence of leukoplakia Of these, 12 could be followed up further and in 8 of them the leukoplakia persisted while in 4 of them it disappeared

Leukoplakia and Cancer

In this series of 605 cases there were 4 cases which were proved to have cervical carcinoma either by biopsy or by post-operative examination of sections of the cervix Two of these had cervical leukoplakia, one had cervicitis with bleeding areas and the fourth had a friable bleeding tumour The first showed a class III smear with trichomonads, the second showed class III smears at first and later class IV smears (case 1), the third had a class IV smear and gonococci in the Gram's smear and the last case showed class IV smears

In 2 other cases the smears were of the class IV type, in one of these there was leukoplakia while the second showed atypical vessels and a bleeding polyp and was considered, on colposcopic examination to be a case of cancer In a third case the initial colposcopic and cytological findings were normal but at a later examination leukoplakia was present and the smears on one occasion were class IV (case 2) In all three cases the biopsy was negative These cases are being followed up by colposcopy, cytology and biopsy

The following two cases will illustrate the usefulness of these methods in indicating the 'dangerous' cases which need careful investigation

TABLE III

Correlation between Colposcopic and Cytological Findings in 605 Women at Initial Examination

Colposcopy	Exfoliative	Cytology		Total
I Normal	I	144	(75 8%)	190
	II	45	(23 7%)	
	III	1	(0 5%)	
	IV	—	—	
II Uncharacteristic	I	214	(67 5%)	317
	II	100	(31.5%)	
	III	2	(0 6%)	
	IV	1	(0 3%)	
III Abnormal				
(a) Leukoplakia	I	47	(51 1%)	92
	II	41	(44 6%)	
	III	3	(3 3%)	
	IV	1	(1 1%)	
(b) True erosion & adaptive vascular hypertrophy	I	2		4
	II	2		
	III	—		
	IV	—		
IV Cancer	I	—		2
	II	—		
	III	—		
	IV	2		

An analysis of the 92 cases of leukoplakia showed that leukoplakia around the gland mouths and a combination of two or more varieties of leukoplakia were the most frequently seen (Table IV)

TABLE IV

Analysis of 92 Cases of Leukoplakia

	Total cases	Percent
True leukoplakia	13	14 1
Mosaic leukoplakia	14	15 2
Ground leukoplakia	18	19 6
Leukoplakia around gland mouths	24	26 1
Two or more varieties present	23	25 0
	92	100 0

Type of Smear and Leukoplakia

The smears in the 92 cases of leukoplakia were graded as atrophic, intermediate or mature according to the modified Schmitt classification described by Peters and others (1958) 32% of the smears from the cases with leukoplakia were of the intermediate type while 60% were of the mature type In comparison, the cases with class I colposcopic findings showed 21% of intermediate smears and 74% of mature smears

Trichomonas vaginalis Infestation and Leukoplakia

A diagnosis of trichomonas infestation by wet vaginal smear or by

the posterior lip with ground leukoplakia on its surface (Fig 5) Repeated smears were class III (Fig 6) and on one occasion class IV Trichomonads were seen in the smear Repeated biopsies from the area of the growth showed however basal cell hyperplasia (Figs 7 & 8)

Such a case requires careful follow up by colposcopy cytology and when necessary biopsy

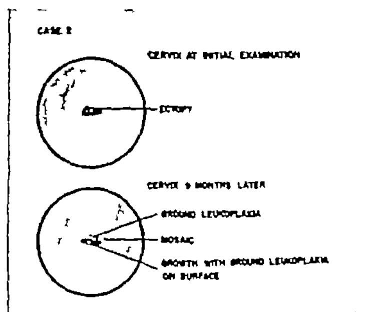


Fig 5
Case 2 Findings on colposcopy at initial examination and 9 months later



Fig. 6
Case 2. Cervical smear showing groups of cells with large hyperchromatic nuclei x330



Fig 7
Case 2 Basal cell hyperplasia Cervical biopsy specimen x54



Fig. 8
Case 2. Higher magnification of figure "
x180

Note The smears were stained by Papanicolaou s method and the sections by haematoxylin and eosin.

biopsy, in a certain number of cases it may be associated with atypical changes in the smear without accompanying malignancy and in still others the cytology may be perfectly normal It is interesting to speculate on the reason for the presence of leukoplakia without malignancy In 1943 Moritz stated that hornification

Leukoplakia of the cervix is thus a colposcopic finding which, in a certain number of cases may be associated with malignancy as shown by positive cytology and proved by changes can be produced in the mucosa of animals through lack of vitamin A Hornification has also been shown by others to follow the prolonged administration of folli-

Case 1 A woman, aged 27, came to the clinic for birth control advice She was breast-feeding her child of 2½ years and was menstruating regularly On routine colposcopic examination, an area of true leukoplakia with posteriorly a zone of ground leukoplakia was observed (Fig 1) The Schiller test was positive The smear showed large cells with bizarre nuclei and, on repeating the smears, malignant cells with large nuclei showing chromatin stippling were seen (Fig 2) The biopsy showed basal cell hyperplasia The smears were, however, persistently class IV type and two months after the initial examination, Wertheim's hysterectomy was done at the Tata Memorial Hospital Most of the sections of the post-operative specimen appeared like sections of chronic cervicitis One of the serial sections, however, showed evidence of epidermoid carcinoma in situ at the squamo-columnar junction (Figs 3 & 4)

This is the type of case which has often resulted in the conversion of a 'Papanicolaou Saul' into a 'Papanicolaou Paul'!

Case 2 A 16-year-old woman who had had her last baby 5 months previously and who was menstruating regularly came to the clinic for birth control advice On examination it was found that she had a small ectopy (Fig 5) and the Schiller test showed irregular staining The smears were class I Seven months later, on re-examination, two areas of ground leukoplakia were seen which did not stain with iodine The smears were still class I Two months later a small growth was seen on

CASE 1

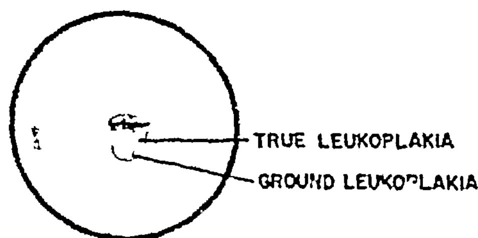


Fig 1
Case 1 Findings on colposcopy at initial examination



Fig 2
Case 1 Cervical scraping showing cancer cells ×400



Fig 3
[illegible]



Fig 4
Case 1 Higher magnification of Fig 3 ×400

ment of Pathology of the Tata Memorial Hospital for making available to us for study the sections of the tissues I would also like to thank Mr A V Khopkar and Mr R V Nerurkar for their help in preparing the microphotographs

References

1 Carter F B, Cuyler K, Thomas W L, Creadick R N Parker R T, Peete C H, Cherny W B and Durham N C Am J Obst & Gyn, 71, 634 1956

2 Hinselmann H München med Wchnsschr 72 1733 1925 (Quoted by W R Lang CA Bulletin of Cancer Progress 6 205, 1956)

3 Hinselmann H Gynecology and Obstetrics by C H Davis and B Carter Vol. III Chap IV Section 1 W F Prior Co, Inc, 1953

4 Kamat M. and Israel S Proceedings of the Sixth I P.P F Conference, New Delhi, 1959, p 269

5 Limburg H Am J Obst & Gyn, 75 1298 1958

6 Moritz W Zeitschr Anat u Entwickl gesch 112 271 1943 (Quoted by Wespi in Ref 10)

7 Papanicolaou G N and Traut H F Diagnosis of Uterine Cancer by Vaginal Smear Commonwealth Fund New York, 1943

8 *Papanicolaou G N Atlas of Exfoliative Cytology* pp 21 31 Commonwealth Fund Harvard University Press Cambridge Massachusetts 1954

9 Peters H Israel S and Purshottam S Fertil & Steril 9, 134, 1958

10 Wespi H J Early Carcinoma of the Uterine Cervix Pathogenesis and Detection Translation by Marie Schiller Grune & Stratton Inc New York 1949

cular hormones in animals In this group of women the nutritional standard was relatively poor Whether regression of the leukoplakia could occur following the administration of vitamin A would need investigation Regarding the hormonal level, in the cases of leukoplakia in this series, the mature smears were relatively less frequent than in the cases with class I colposcopic findings It is well known that trichomonas infestation can produce atypical changes in the cervical epithelium, sometimes to the extent that the smear gives the appearance of malignancy In this study, 22% of the leukoplakias showed trichomonads in the smear as compared with 12% in the whole series

In conclusion it should be stressed that every case showing leukoplakia should be followed up with colposcopy and cytology, while in those cases showing class III or class IV smears biopsy from 'target' areas selected by colposcopy should be done However, negative biopsies should not make one complacent and every attempt should be made to induce the woman to return for repeated examinations

Summary

1 The procedures of colposcopy and exfoliative cytology are briefly described and the usefulness of these methods in the diagnosis of early cancer of the cervix is stressed

2 The different types of leukoplakia of the cervix are described

3 The findings of 605 initial colposcopic and cytological examinations are analysed The incidence of all types of leukoplakia in this series is 15.2% (92 cases)

4 A correlation between the number of atypical smears and the incidence of abnormal colposcopic findings was observed

5 The proportion of intermediate to mature smears was greater in the cases with leukoplakia than in those with normal cervices

6 A higher incidence of trichomonas infestation was noted in the cases with leukoplakia than in the whole series

7 In the small group of cases in which endocervical smears were taken as a routine, there was no significant difference between the cases with leukoplakia and the whole group in the number of smears showing gonococci

8 The findings on follow-up of a few cases are mentioned

9 The incidence in this series of cases of proven cancer and of suspected cancer is given

10 Two cases illustrating the usefulness of these methods are discussed

11 The necessity for inducing cases with leukoplakia of the cervix to return for a follow-up examination is stressed

Acknowledgments

Dr Melba Kamat, Medical Officer of the Contraceptive Testing Unit, carried out a certain number of colposcopic examinations reported in this paper for which I am grateful I would like to thank Dr Hannah Peters for her guidance in the cytological studies and the Staff of the Medical Division of the Atomic Energy Establishment for their cooperation and technical assistance Thanks are also due to the Depart-

health of any kind, so the dysmenorrhoea is often associated with debilitating disease Acute illness may temporarily cause dysmenorrhoea

Haman found that the average pain threshold in the dysmenorrhoeic group was lower than that for the other group

The conditions which cause sluggish circulation in the pelvic organs tends to make dysmenorrhoea worse such as chronic constipation, sedentary life and unsatisfied sex urge

Theobald (1936) is of the view that the pain is due to rigidity of cervix rather than spasmodic con tractions of fundus of uterus

Goodall and Power (1937) suggested that spasmodic dysmenorrhoea is an allergic manifestation Various antigens including hormones and menstrual toxins have been blamed

Davis (1938) is of the opinion that dysmenorrhoea is due to the imbalance in the autonomic nervous control Overaction of sympathetic leads to hypertonic condition of the circular fibres at the isthmus and internal os The same condition is found due to the sympathetic upset which produces bowel and bladder tenesmus which accompany dysmenorrhoea

Malformations of the uterus also cause dysmenorrhoea, because the arrangement of the muscle fibres is abnormal

In England, menstruation most commonly commences during the 14th and 15th years of life and it is probable that the menarche occurs either before or after that period of life in less than 15 per cent of girls At their onset the menses are often irregular and the interval between the first and second period may exceed a year The first period is rarely, if ever, painful and it is only after the lapse of one or more years that pain begins to be associated with the flow In some of the worst cases of dysmenorrhoea the history of freedom from any menstrual pain for some years after the onset of the menarche is frequently elicited It may, therefore, be reasonably concluded that the pain is not caused by, or even associated with, structural defects in the uterus

The pain may commence some hours before the flow or may not occur until it becomes established It may last a few hours or may persist for two days or longer It is usually described as being cramp-like rather than continuous The pain may be very mild, causing less discomfort than a purgative, while it may be as intense as that pain is experienced during normal labour and may be associated with pyrexia and vomiting

The pain is most commonly referred to the lower abdomen but sometimes to the lower part of the back or over the hips and still less commonly down the upper third of the inside of both thighs The pain may be associated with fainting attacks and vomiting which require bed rest for some hours On the other hand some women never experience the pain or discomfort during menstruation The majority of women complain of pain which is usually tolerable and does not interfere with their daily work but the pain symptoms increase when the same women have to work hard or have an excited life The onset of dysmenorrhoea is often associated

DYSMENORRHOEA

by

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Introduction

As early as 2000 B C some prescriptions are found for the treatment of dysmenorrhoea in Egyptian writings (Ebers and Kahan Pagyri) which suggest that dysmenorrhoea was also a common complaint of *women in ancient period*

Estimation of the incidence of dysmenorrhoea varies greatly with different investigators

Stone estimated that 35% of all women complain of some pain with menstruation Cunningtan found 50% of the 1400 students of California University complaining of severe pain during menstruation Statistics of women students of 29 colleges and universities showed that 45% of these women students complained of some pain during menstrual periods and 14 6% had severe pain requiring bed-rest (W B Brown) J O Haman made a detailed study of women working in industrial areas and showed that [illegible] of the 32 million women workers were not working for two [illegible] or twenty six hours a year, i e 140 million hours are lost annually due to dysmenorrhoea In our analysis we have not actually investigated the inefficiency of work, but students did complain of absentism from colleges and high schools and thus they suffer from loss of study hours during these days

Etiology

Dysmenorrhoea is due to spasmodic and disordered contractions of uterine muscles

Moir believes that the pain is due to the contraction of ischaemic muscle which causes anoxia of the muscle

Bickers (1941) produced evidence to show that the essential for pain is high tonicity of muscles on which the contractions are superimposed

Disordered contraction of the muscle may be due to hormone imbalance A dysmenorrhoeic mother usually has a dysmenorrhoeic daughter

The inherited pain threshold varied from one individual to another (Haman, 1944) It is lowered by ill-

lege of Ahmedabad were also taken for this analysis

Severity of Dysmenorrhoea

(1) Those who had not experienced any pain during menstruation and thus had normal routine life
(2) Those students who had some pain during or before the start of menstruation which did not allow them to do hard work, exercise or games
(3) Those students who had some pain during menstruation but can attend to their normal work
(4) Those students who suffered from the pain so severely that they could not attend the schools or colleges

Those students who complained of severe dysmenorrhoea were regularly taking some treatment for the relief

Table I

	No of cases	Percentage
Symptom free	380—4	50 66%
Symptoms		
No change in routine	216	28.8 %
Absent from games and exercise	90	12%
Absent from schools and colleges	64	8.53%
	750	

Dysmenorrhoea and Infection (Mumps)

In this series the students who gave the history of mumps were taken Some of the students could not remember whether they had mumps in the past, so this number was considered as having no infection with mumps

	No mumps	Mumps
	440	310
Symptom free	*170*	*210*
Change in routine	128	88
Absent from exercise and games	46	44
Absent from colleges and schools	34	30
	55%	45%

Relationship between Exercise and Dysmenorrhoea

On inquiry it was observed that most college students during menstruation were absenting themselves from physical training while high school students were found to do exercise and play games during menstruation in a greater number

The number of students who daily participate in some sort of exercise and games are very few In the present series only 40 students gave the history of regular exercise

	Exercise	No exercise
Symptoms	22	358
Change in routine	15	201
Absent from exercise	2	88
Absent from colleges and schools	1	63
	45%	49.57%

Dysmenorrhoea and Mental Condition

Only nine students had some sort of mental weakness and were asked by their relatives to be absent from schools It may be that they all had pain and some discomfort during menstruation Only one student

with a change of work or of environment

Definition

Dysmenorrhoea is the term used to cover various types of pain during menstruation

I Primary dysmenorrhoea or true dysmenorrhoea is the term used when the pain is of uterine origin and directly due to menstruation It is often called spasmodic dysmenorrhoea, intrinsic, essential or functional dysmenorrhoea

II Congestive dysmenorrhoea is the term used when the pain arises in some organs other than the uterus and is merely associated with menstruation This includes congestive and ovarian dysmenorrhoea

Material for Investigation

A study of about 750 students of high schools colleges and training college of Ahmedabad was done as regards their menstrual history

This paper gives the data of menstrual function in students and incidence of dysmenorrhoea with relation to age social status economical condition family history and infection in young age

All the students were interviewed personally and full history was obtained about their age income per head of the family, their diet, infectious diseases in past and family history

Their height weight and span were taken Their measurements of [illegible] abdomen and pelvic girth were [illegible] Blood pressure of [illegible] noted

[illegible] in this [illegible] of pains, experienced by the students just before and during menstruation Also history of ovulation pain was considered

In this analysis majority of the students were unmarried and most of them are in the beginning of their menstrual periods

Comparison between College and High School Students

Not any significant difference was found between these two classes of students, but the percentage of dysmenorrhoea was low in college students because the percentage of married students was high in college, but incidence and severity of dysmenorrhoea was the same in unmarried students of the colleges and high schools

		Married	Unmarried
High Schools	566	20	546
Training Colleges	134	58	76
Colleges	50	14	36
	750	92	658
No change in routine		58	322
Change in routine		17	199
Absent from exercise		11	79
Absent from schools		6	58
		37% (36.95%)	63% (63.05%)

Unmarried students gave the history of dysmenorrhoea more than the married ladies In this married class of students some of them even had children

The students from standard ninth tenth and eleventh were interviewed from different high schools of Ahmedabad city

Some students from colleges were interviewed The students below the age of thirty from the Training Col-

Some fallacies are likely to be in this analysis as standard of cleanliness was not the same in the present group of students

Also the students who were stout and who perspire more were likely to change the pads earlier

Some students really wanted to change the pads but could not do so because of school and college working hours and lack of facilities to change the pads

The material of pads used by all the students of this group was not the same and different materials have different powers of absorption, so the right judgment is not possible by the method of pads

	Total no of students
Scanty flow	105
Moderate flow	569
Profuse flow	72
Primary amenorrhoa	4
	750

Here the absenties from schools and colleges may be due to profuse flow of blood rather than actual dysmenorrhoea

Dysmenorrhoea and Hostel Life

Total students who studied in this group is 134 The students who were staying with their families at home and had to come into the hostel for study were questioned about any change in dysmenorrhoea experienced in the menstrual period

The incidence of dysmenorrhoea was high in the beginning of their hostel life, but after some periods they got adjusted and forgot the pain syndrome because of their busy life in the hostel

No change in routine	60
Change in routine	49
Absent from exercise	15
Absent from schools and colleges	10
Total	134
	55.22%

The percentage of pain is not very high Some of these students are married and have children These students are training college students who were teachers in primary schools

Relation of Dysmenorrhoea to the Size of the Family

In this analysis it is found that the only child of the family had more complaints about menstruation as well as of dysmenorrhoea Also the incidence was high amongst those students whose other family members were experiencing pain during menstruation This is likely to be more psychological because most of the students observe curtailment of the routine work in their homes

It has been also found that the students who had left the family environment for the first time had more complaints about dysmenorrhoea than the same group of students who left their homes earlier or had an experience of leaving the house before

Relation of Dysmenorrhoea with the Length of Menstrual Period

1 *Short* Short periods were considered in those whose flow of blood lasted from two to three days
2 *Medium* Medium periods were considered in those students who gave the history of

gave the history of hysterical fit just after the flow of menstruation

Dysmenorrhoea was experienced by the students a few hours before and after the onset of menstruation Some of the students had given the history of pain lasting for more than twelve hours, but in the majority of the students the pain did not last for more than ten to twelve hours

According to Theobald (1946), the pain is distributed over the areas of the body supplied by the first lumbar segment, but others include tenth, eleventh and twelfth thoracic segments Some students had given the history of nausea, vomiting and fainting attacks during the attacks of pain The evidence of the rectal and bladder tenesmus was observed in some women students

Discussion

Drillen's (1946) inquiry among 700 members of the Auxilliary Territorial Service was valuable because it deals with what may be regarded as a cross section of the young adult female population She found the incidence of pain as high as 60% in women aged 20 and 21, falling slowly in next few years, with a steep drop to 35% by the age of 27 years In the whole group only 47 5% were completely free from discomfort but only 7 2% had found it necessary to take medical advice about dysmenorrhoea

J O Haman in calculating the industrial importance of dysmenorrhoea figured that if 16 6% of the 32 million women between the ages of 12 and 50 were laid up for two hours during a period or twenty six hours a year, there would be 140 million hours lost annually due to dysmenorrhoea On the basis of a norm of 2400 working hours a year per person, this loss of time represents an entire year of work by approximately 38,000 women Not only is the actual time lost of importance, but also the many hours of inefficiency while the woman is in pain and attempting to carry on her job

Quantity of Flow and Dysmenorrhoea

1 *Scanty* The flow of blood discharge was taken as scanty when two pads were changed daily by the students
2 *Moderate* When students used to change three to five pads daily
3 *Profuse* When students require to change more than five pads daily.

Flow of Blood and Dysmenorrhoea

	Scanty	Moderate	Profuse	Amenorrhoa Primary
No change of routine	105	569	72	4
Change of routine	42	218	716	
Absent from exercise	36	150	30	
Absent from schools and colleges	17	58	15	
	10	43	11	
	60%	44 1%	63 88%	

the flow of blood from four to six days

3 *Long* Long periods were considered in those students who gave the history of bleeding more than seven days

Lengths of the periods	No of students
Short less than 3 days	134
Medium less than 6 days	516
Long above 7 days	96
Primary ammenorrhoea	4
	750

Those who gave the history of short periods suffered more from dysmenorrhoea than those who had medium type of duration of blood loss

Dysm Married	Schools & Colleges
No change in routine	48
Change in routine	12
Absent from exercise and games	8
Absent from SchooL and Colleges	4
Total percentage of discomfort	33%

Unmarried — Total	658	
High School	546	
College	36	112
Training School	76	

Dysm Unmarried	Schools	Colleges
No change in routine	268	51
Change in routine	165	35
Absent from exercise	65	1[illegible]
Absent from schools and games	48	11
Total % of discomfort	51%	54%

	Short	Medium	Long	Amm
Total	134	516—4	96	4 = 570
No change of routine	61	289	26	4
Change of routine	40	129	47	
Absent from exercise & games	20	59	11	
Absent from colleges & schools	13	39	12	
	54 40%	43 97%	72.9%	

Dysmenorrhoea and Married Life

	Total no 750	
Total no of married students	92	
History of miscarriage and no full t rm delivery	4	36
Sterility	5	
Left husbands house	11	
Married life not more than two years	16	

The remaining students had delivered a child, and percentage of dysmenorrhoea is markedly less in them but three students gave history of sepsis after delivery, and pain of pelvic area has started after the delivery

It can thus be seen that the incidence of dysmenorrhoea is much higher in unmarried girls than in married girls There is no appreciable difference between the High School and College girls

Dysmenorrhoea and Irregularities in Menstrual Periods

Most of the students had some complaint about menstruation Some had ovulation pain and delayed and irregular periods Some had given the history of short length of the periods

TABLE 1

Family and Dysmenorrhoea

Rank of the girl	1	2	3	4	5	6	7	8	9	10	11
Total number	35	40	51	55	109	125	97	93	52	9	44
No pain	12	15	23	24	65	67	52	51	25	15	31
Change in routine	10	12	15	19	30	34	31	30	19	12	4
Absent from games	7	8	7	6	12	10	10	11	7	9	3
Absent from college	6	5	6	4	12	11	4	1	1	3	6
Total percentage of discomfort	65%	62 5%	54 9%	56.3%	49 9%	46 4%	46 3%	45 1%	51 1%	48 9%	29 5%

As can be seen the incidence of dysmenorrhoea was highest in the first child In some cases they were the only child of the family It is likely that psychological and environmental factors may be responsible for this high incidence in the first and only child

TABLE 2

Age and Dysmenorrhoea

Age in years	15	16	17	18	19	20	21	22	23	24	25	26	Above 27
Total	104	97	105	88	72	53	34	39	48	34	26	25	27
Symptom free	52	50	52	46	32	25	20	21	27	16	14	13	13
Change in routine	29	27	28	27	26	17	8	11	12	12	7	5	7
Absent from games	12	12	15	9	8	8	4	4	4	2	3	5	4
Absent from colleges and and schools	11	8	10	6	7	3	2	3	5	3	2	2	2
Total % of discomfort	50%	48 43%	50 47%	47 63%	57 77%	52 83%	41 77%	46 16%	43 6%	51.51%	43 6%	48%	51 4%

It can be seen from the above that the incidence of spasmodic dysmenorrhoea is maximum within age group 19 and 20 The slightly higher percentage of dysmenorrhoea in the 15 year group is apparent as the dysmenorrhoea was more of discomfort than actual pain Similarly, the higher percentage in age group 24 and above 27 was more due to congestive or acquired dysmenorrhoea These correspond with figures of earlier workers

REPORT OF 80 CASES OF RUPTURE UTERUS

by

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and

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The term rupture of the uterus is usually employed to denote rupture after the period of viability of the foetus Rupture was first described by Bandl in 1875 Its actual incidence amongst pregnant and parturiant women is difficult to assess because hospital statistics vary greatly These statistics are also modified by the type of patients admitted in the hospital and the class to which they belong Some hospitals get well supervised antenatal cases for the delivery, while others get as emergency village patients who have very inadequate supervision if any at all In our hospital we get many patients from the surrounding villages as emergencies They come to the hospital when village doctor or untrained dai is unable to do anything for them So definite incidence of rupture uterus cannot be assessed Burrows (1941) of Cleveland reports an incidence of 1 in 1483 deliveries, Lynch (1945), Boston City Hospital, 1 in 1118 deliveries Delfs and Eastman (1945), John Hopkins Hospital, 1 in 1010 deliveries, and M C Watsa (1954), Wadia Maternity Hospital, Bombay, 1 in 1972 deliveries

In Shree Sayaji General Hospital, Baroda, there were 80 cases of rupture uterus during last seven years, 1953 to 1959

Total deliveries were—15,350

Incidence at S S G Hospital, Baroda, is 1 in 200 deliveries, i e six times more common than in above mentioned hospitals

An attempt has been made to find out from which place the maximum cases came

Baroda proper	15
Baroda taluka	30
Savli	10
Dabhoi taluka	8
Other villages	13
At the S S G Hospital, Baroda	4

It is found that majority of them came from the villages Now in government hospitals and dispensaries in the villages there is a medical officer and a trained nurse But they do not know which cases they should themselves handle and which they should direct to the hospital. They give injections like pituitary and ergot derivatives to hasten the delivery which does not help but, on the other hand, harms the patient by rupturing the uterus in obstruct-

	Regular	Irregular
Total	402	348
Symptoms free	225	155
Change in routine	20	136
Absent from exercise	42	48
Absent from College and Schools	55	9
Total % of discomfort	44 02%	55 48%

The incidence of dysmenorrhoea was less amongst the students who gave the history of regular menstruation

Conclusion

Primary dysmenorrhoea does not commence at the menarche but starts usually after the age of 18

Estimation of pain symptom is very difficult because of the psychogenic factor and criteria of discomfort

The incidence of dysmenorrhoea varies with age, occupation and social status, family environment and habits, heredity conditions

Mental conditions make the dysmenorrhoea worse, examination, change of occupation or house (hostel life from home life) previous illness, infectious diseases, temporarily cause painful periods The most fascinating and illuminating factor of the problem of dysmenorrhoea is its indivisibility from psychological factors The pain of menstruation is often less complained when the same women go to the hospital for investigation

The onset of dysmenorrhoea is often associated with change of work or of environment Primary dysmenorrhoea is almost invariably cured by deliveries

Primary dysmenorrhoea is often as much dependent on the structural defects in the uterus as it is on psychological factors directly or indirectly

Acknowledgment

This work was supported by a grant from the Gujarat University We take the opportunity to thank Dr M D Desai, M S, F R C S, M Ch Orth, Director, School of Post-Graduate Medicine and Research and Superintendent, Sheth Vadilal Sarabhai General Hospital & Sheth Chinai Maternity Hospital, Ahmedabad, for permission to publish this paper We also thank Dr K A Shah, M B B S, Medical Officer, Gujarat University, for his help in collecting statistical data

References

1 Bourne Aleck British Obstetrics & Hygiene Practice
2 Brown W B, Haman J O and Cunningham
3 Crossen Robert James Diseases of Women
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5 Theobald G R Referred Pain A New Hypothesis, Colombo, 1941 Report of London Association of the Medical Women's Federation, Lancet, 11, 57, 1930

came late in labour, about 5 hours later, to the hospital Rupture was found at the region of the scar Babv was alive

In the second case caesarean section was done for concealed accidental haemorrhage last time This time patient delivered vaginally but the placenta was retained Placenta removed manually After that patient continued to bleed per vaginam and hence uterine cavity was explored which revealed tear in the lower segment

5 *cases of classifical scar rupture*

2 cases had twin pregnancy this time and sustained rupture during labour Scar gave way due to overstretching of uterus In both cases live babies were delivered but they expired after a few hours

The third case had one full-term *delivery at home after classical section for placenta previa* This time she was in labour for five hours at home and was treated by a local practitioner who gave pituitary injections to terminate labour, but as there was deterioration in her condition she was referred to this hospital and was admitted in a collapsed condition with rupture uterus Now this patient should have been transferred to the hospital as soon as she was examined by the practitioner In such cases the patient is not safe even if she delivers normally after caesarean section There is always a danger in all successive pregnancies as the scar of classical caesarean section is the weak point for all the deliveries Also the situation of the placenta may be on the uterine scar and this makes the scar more weak and liable to easy rupture In this case placenta was situated anteriorly on the scar and was responsible for the rupture and the process was hastened by the pituitary injections

The fourth case of caesarean section, done for disproportion, was admitted to the hospital for observation and elective caesarean section Rupture occurred in this case in spite of the patient being in the ward Patient did not inform when she started labour pains In this case placenta was situated anteriorly on the scar which might have been responsible for the scar giving way during labour

The fifth case, also of disproportion, was about 34 weeks pregnant and was advised admission at that time She refused and, the next day came with labour pains, with the result that by the time she came, the scar had already ruptured In *this case also placenta was situated on the scar which was responsible* for the rupture

Thus out of all the above five cases three had situation of the placenta anteriorly on the scar, making the scar weak Rupture occurred in all the cases during early labour

(ii) *Abnormal presentation of the foetus*—31

(i)	Occipito-posterior	6
(ii)	Deep transverse arrest	5
(iii)	Compound head & hand	2
(iv)	Transverse lie with hand prolapse	13
(v)	Face presentation	4
(vi)	Hydrocephalous	1

(iii) Contracted pelvis with malpresentation of the foetus—10

(iv) Severe degree of pelvic contraction—4

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nancy likelihood of rupture is increased They also suggest that the lower segment which in previous labour was overstretched, might easily in a subsequent labour reach this dangerous condition

Murphy (1947), on the other hand, considers the primary causative factor to be the stronger activity of the multiparous uterus Many of the complications in multiparous women are unexpected and are therefore more dangerous Minor degree of pelvic contractions or the milder forms of hydrocephalous, unnoticed in the ante-natal period, may cause serious obstruction in labour Also face or brow presentation may remain undetected until labour is advanced A baby slightly larger than usual is also found in many cases

Average birth weight in this institution was noted and found to be 5 lbs and 8 ozs while in this series about 78% had birth weight above this average Thus it may be concluded that multiparas have a tendency to have large babies

Williams (1947) holds a different view He found that the main cause responsible for difficult or obstructed labour in multigravidas was a small pelvis and a large baby, and he showed that the pelvic contraction was due to a mild form of osteomalacia It is important to appreciate that the multiparous uterus is ill adapted to withstand stress and strain It responds to obstruction by strong contractions and may rupture suddenly

Spontaneous rupture of primigravidous uterus is extremely rare even in presence of contraction In this series there were two primiparas who were given oxytocic drug in presence of abnormal presentation and pelvic contraction.

Warning against the danger of rupture in grand multipara — J K Feeney (1954) writes, "When treating the multipara, bear the possibility of rupture in mind If you do so, you will often suspect if when it has not occurred, but you are not likely to overlook it if it has taken place The uterine muscle of primigravidas is "wise" if it finds that it has too much to do, it 'retires' into protective inertia On the other hand, the uterus of the multipara is resentful of obstruction and tries hard to overcome it

History of Labour

Time interval from start of labour pains to stoppage of pains varied in all cases, from 6 hours to 3 days In 2 cases it was 2 hours only The time interval in patients with rupture caesarean section scar was much shorter compared to that in patients of spontaneous rupture during labour due to obstruction In 2 cases it was 6 hours and in 1 case only 1 hour

Duration of Stoppage of Pains

Duration of stoppage of pains varied in all the 80 cases It is a proved fact that prognosis depends on the time when treatment is given after rupture has occurred If the patient can get the treatment as soon as the rupture occurs, the chances of her survival are better But as the time passes after the rupture has occurred, each hour adds more risk to the patient's life and prognosis becomes grave When rupture occurs

abour and endangering the life ne mother as well as of the foe-

Some of them even do not refer patients previously operated for esarean section and treat them till e uterus is ruptured If they know at such cases should be delivered the hospital under strict super-ision with all the facilities avail-ble for operative interference, this disaster may be averted

Many cases are very badly handled by untrained dais in the villages They do what is known as "Kalla" on the abdomen of the patient in labour They try to push the whole baby down with all their forces Sometimes they stand astrandle on the abdomen of the patient, to use greater force Many patients get bruises on their abdomen and the back due to this manipulation This is one of the commonest causes of rupture uterus which along with other causes precipitates the disaster

Vaginal manipulations are also done by them which produce bad lacerations and tears of the vagina, vulva and perineum

Varieties and Pathology

Rupture of the uterus may occur during pregnancy or during labour In none of these cases rupture occurred during pregnancy

Rupture during labour may be *spontaneous* or *traumatic*

Spontaneous rupture during labour is very common and the following are the causes of it

(1) Previous caesarean section scar
(2) Grand multiparity
(3) Contracted pelvis
(4) Mal-presentation and mal-position of the foetus
(5) Tumors of the pelvis
(6) Oxytocic drugs-pituitary — ergot
(7) In some cases of normal labour—cause not known

Pathology of spontaneous rupture during labour in cases of disproportion, malpresentation and malposition is by overstretching of the lower uterine segment During normal labour, the uterine wall becomes differentiated into an upper active part which retracts as labour proceeds, and the lower passive part which becomes dilated and stretched Separating the two is a well defined ridge called the retraction ring In obstructed labour retraction proceeds to an extreme degree in the active portion while stretching becomes extreme in the passive lower segment which is now made to accommodate the greater part of the body of the foetus Retracting ring rises up even above the umbilicus The wall of the distended lower segment is greatly thinned and later on gives way So in these cases rupture is more common in the lower segment

In this series of 80 cases, following were the causes for spontaneous rupture

1 Previous caesarean scar rupture—7

(i) Lower segment—2
(ii) Classical—5

2 Cases of lower segment scar rupture—

Patient was operated last time for caphalopelvic disproportion This time she did not attend the antenatal clinic during pregnancy and

abdominal swelling Tenderness in the region of the scar was present in 3 cases of classical scar rupture

In 4 cases placenta was retained after vaginal delivery and diagnosis was made on uterine examination

In 2 cases patients were taken for caesarean section and rupture was found

In one case diagnosis was made on post-mortem examination

Bleeding per Vaginam

This is one of the important diagnostic signs of rupture uterus Blood escapes per vaginam after the rupture and haemorrhage takes place in the peritoneal cavity Really speaking it should be present in all the cases but it was not present probably because the presenting part was fixed in the pelvic cavity and did not allow the blood to escape

Vaginal Examination

Vaginal examination was done in the majority of cases, but none of them were diagnosed, except when placenta was retained and the uterine cavity was explored

There were 3 cases when head was on the perineum One was a case of colporrhexis, i e rupture in the anterior vaginal wall Dr M K Krishna Manon (Madras) who has reported 5 cases of colporrhexis and Camble, Freul and others, all believe that colporrhexis occurs only after full dilatation and retraction of the cervix, with the presenting part continuing to press upon and distend the vagina

One case of colporrhexis in this series was a fifth gravida, being in labour for 24 hours Injections were given by local doctor probably pituitary Head was seen on the perineum with a big caput Baby was in the peritoneal cavity and a transverse tear was found anteriorly at the cervico-vaginal junction The above discussion leads us to the conclusion that rupture of the anterior vaginal wall occurs after full dilatation of cervix

Investigations

Urine Examination Catheter specimen of urine was examined whenever urine was available

1	Frank blood	4
2	Blood stained	13
3	Albumin present	18
4	Clear urine	29
5	Not examined	16

Eastman gives much importance to this clinical sign When blood is found in the urine the diagnosis of rupture is confirmed, but, when the urine is clear, rupture should *not* be ruled out as a possibility Bleeding in the bladder is due to obstructed labour or due to tear which might have extended from uterus to bladder Not a single case was found with tear extending the bladder in this series

Findings on Operation Table Free blood in various quantity was found in the peritoneal cavity except in cases of incomplete rupture

Site of Tear

(1)	Lower segment—anterior—transverse	53
(2)	Lower segment—anterior—vertical	3
(3)	Lower segment—anterior—oblique	4
(4)	Lower segment—posterior	5
(5)	Body of the uteru —anterior—vertical	2
	posterior—transverse	1
(6)	Colporrhexis	1

(v) Tumor in pelvis — ovarian cyst—1

(vi) Oxytocic drug—20

(vii) Cases of normal labour, cause not known—4

Out of 20 cases, 15 cases were with abnormal presentation

Injudicious use of oxytocics has been one of the important causes of rupture in these cases It may be remarked that one should be very cautious in their use even if no disproportion or any other abnormality is detected

In this series there were three interesting cases of *traumatic rupture* The first case was one where rupture occurred after a kick by a buffalo The patient was 8½ months' pregnant and was admitted 20 days after the accident with severe peritonitis and poor general condition She was operated after 2 days as she was not responding to antibiotics and all other methods of resuscitation On the operation table the rent in the uterus was transverse in the lower segment Baby and placenta were in the peritoneal cavity There were adhesions between the intestines and the placenta Edges of the rent were fibrosed and hence were not sutured Patient expired on the eighth day due to sepsis

The second case was one of twins A IV para delivered one live baby by vertex at home After one hour she was admitted to the hospital She was having mild pains and presentation was diagnosed as breech on abdominal examination No interference was done but after one hour a hand was found prolapsed in the vagina, hence internal version and breech extraction was done There was difficulty in delivering the after-coming head Placenta was retained and manual removal was done After removal of the placenta, uterine cavity was explored and rupture was found Patient was taken for abdominal operation and on opening the abdomen a rent was found in the oblique direction in the lower segment Rent was sutured Patient expired in the evening on the same day

The third case, para III, admitted with hand prolapse since 1 hour, and having been in labour for the last 5 hours and 30 minutes On admission uterine contractions were present F H S absent Internal version with extraction of breech was done Placenta retained An attempt at manual removal of the placenta revealed rupture of uterus Patient was immediately operated per abdomen and free blood was found in peritoneal cavity and in the left broad ligament Repair of the tear was done Post-operative, no complications Fifteen days after discharge from the hospital, patient came with fever and swelling of the abdomen Patient had developed broad ligament haematoma which resolved after conservative treatment

Parity

Risk of rupture uterus is more in multipara than in primipara

Munro Kerr and Chassar Moir (1949) state that risks of child bearing are greatly increased in high parity They state that increase in fibrous tissue occurs in uterine muscle subsequent to each pregnancy and thus after multiple preg-

Previous records of treatment in this hospital in cases of rupture uterus of last four years from 1949 to 1953 were collected There were total 11 cases Hysterectomy was done in all the cases and there was 100% mortality Thus we have found repair of rupture uterus a better procedure than hysterectomy, as it is less shocking and as it could be done when blood was not available

Now most dangerous are the cases where no sterilisation is done This line of treatment was undertaken in cases who had no living child or only female issues, and have been followed up in subsequent pregnancies

One case became pregnant after nine months She had a tear in the lower segment in her last delivery due to obstructed labour by compound presentation During this pregnancy she was attending antenatal clinic regularly She was IV gravida and delivered vaginally after being in labour for six hours Baby, 5 lbs, good condition

Second case conceived after 8 months She had a tear in the lower segment due to obstructed labour caused by face presentation X-ray pelvimetry was normal, she was IV gravida and attended antenatal clinic once in the 3rd month She miscarried at the 6th month Again after 1 year she came with 7 months pregnancy with bleeding p v She was kept under observation in the wards till full-term and caesarean section was done when she got another bout of bleeding She was a case of placenta previa Baby alive, sterilisation done

The third was a case who had normal delivery at home and was admitted to the hospital for retained placenta, on manual removal a tear was found in the lower segment Rent was sutured After 1 year she came with full-term pregnancy and lower segment caesarean section was done in view of her having mild degree of disproportion

Cases are recorded in the literature where tear was sutured and next time there was normal vaginal delivery Lazrelie reported, in 1932 a case who refused sterilisation and delivered next time vaginally

Naguib Mafouz Bay followed patients treated conservatively and traced 15 of them Five had one or more pregnancies, and labour ended without accident Ten did not conceive at all He believes that the repetition of the accident in the same patient is due not so much to the weakness of the scar as to the persistance of the abnormal condition which led to the first rupture Though natural deliveries have occurred, he thinks it is safer to deliver these cases by caesarean section as there is definite risk for mother and child in vaginal delivery

All the cases of rupture uterus without sterilisation should be watched carefully during ante-natal period and labour It is safer both for mother and child if caesarean section is done in these cases when any abnormality is detected, but if everything is normal a short trial may be given for vaginal delivery

Sub-total hysterectomy was done in 8 cases Out of these, 3 cases expired Thus this line of treatment is adopted in cases where the tear is very extensive and repair was not possible

there is haemorrhage and shock Haemorrhage is controlled by nature as uterus contracts nicely after foetus and placenta are expelled into the peritoneal cavity But if uterine vessels on either side are involved in the tear, bleeding continues till immediate treatment is given to check the bleeding Shock, if not treated in time, becomes irreversible Infection plays an important role as time passes after the rupture In the majority of cases membranes rupture early and danger of infection increases Besides patients are usually manipulated vaginally by untrained dais in the villages which adds to the incidence Thus infection is already present in a case of prolonged labour badly handled by dais and delay, in the proper treatment after rupture, results in greater spread of infection of peritoneal cavity.

In these 80 cases there were 30 deaths Only 3 cases expired due to sepsis and did not respond to even broad spectrum antibiotics

General condition of the patients on admission

8	Cases—pulse	imperceptible—all expired	
20	-do-	150-170/M—	12
10	-do-	150-160/M—	5
12	-do-	140-150/M—	2
10	-do-	130-140/M—	2
15	-do-	120-130/M—	1
5	-do-	Caesarean scar rupture—pulse — 100-110/M — all alive	

There was marked fall in blood pressure both systolic and diastolic Majority of the patients had signs of shock and haemorrhage, such as restlessness, vomiting, perspiration, dry tongue

Abdominal Examination

Abdominal findings vary according to the type of rupture Rupture may be complete or incomplete Complete rupture is more common and in that case foetus, placenta and membranes are usually expelled into peritoneal cavity In incomplete rupture, peritoneum covering the uterus remains intact The characteristic finding of incomplete rupture is that the unruptured peritoneum is lifted from the musculature by the collection of blood and occasionally by expelled foetus or placenta

Out of 80 cases, 66 could be diagnosed as rupture uterus on abdominal palpation as the following classical features were present

(a) An alteration in the shape of abdominal swelling, as the baby was expelled out of the uterus in the abdominal cavity In 8 cases retracted uterus was lying side by side In other cases it was not possible to distinguish the two swellings as uterus was displaced behind or in front of the child

(b) Foetal parts were easily palpable in all the cases

(c) Tenderness was present all over the abdomen, there was no rigidity

(d) Distension of the abdomen was present in 12 cases, it was more marked in epigastric region

(e) Foetal heart sounds were absent in all the cases

There were 2 cases of incomplete rupture—the shape of abdomen being normal, foetal parts could not be palpated, but tenderness was present all over There were 7 cases of caesarean scar rupture There was no alteration in the shape of the

Only one baby survived, in a case of lower segment caesarean section scar rupture Patient was in a good condition and foetal heart sounds were present on admission Baby was saved as operation was performed in time

Breast Activity

Whether the breast activity was present or not was noticed in all cases, except the cases which expired on the same day of operation

In only 2 cases, normal breast activity was found, one case of lower segment caesarean scar rupture baby alive, and the other one was a primipara, a case of spontaneous rupture due to obstructed labour, baby S B

Other cases did not show any activity, such as engorgement of breasts, tenderness, secretion of milk or even slightest discomfort

Why should there be no activity?

Is it due to severe shock and haemorrhage or hormonal influence?

This observation can be followed up in other cases of shock and haemorrhage, such as placenta previa, accidental haemorrhage, P P H

Summary and Conclusions

(1) Report of 80 cases of rupture uterus
(2) Incidence is six times more common
(3) Rupture is more common in *multiparas*
(4) Use of powerful oxytocies and interference by untrained dais hastened the rupture in many cases
(5) Treatment generally adopted is repair of rent
(6) Maternal mortality is 37%
(7) Foetal mortality is 95%
(8) Breast activity was absent in majority of cases Shock and haemorrhage were found responsible for absence of breast activity in this series

Acknowledgment

Our thanks are due to the Superintendent, S S G Hospital, Baroda, for reviewing the above cases

References

1 Browne F G Post graduate Obstetric and Gynaecology
2 Devis Carl Henry Gynaecology and Obstetrics
3 Eaden and Holland Manual of Obstetrics by Alan Brews
4 Eastman N J Williams Obstetrics
5 Freeney J K Obst. & Gynaecological Survey 10, 210 212, April, 1955
6 Gibbard, G F A Short Textbook of Midwifery
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8 Ingram J M. Am J of Obst. and Gyn 64 527-534, Sept. 1952
9 Kenneth Bowes Modern Trends in Obstetrics and Gynaecology
10 Krishna Menon M K J of Obst. and Gyn of India 2 129 135 March 1952
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(7) Classical scar rupture	4
(8) Lower segment scar rupture	2
(9) At the lateral side of the body of the uterus	4
(10) Post-mortem diagnosis of rupture Tear on posterior aspect extending from 1″ above the left round ligament to 2″ above right one—semi-circular	1

Eden and Holland state that the direction of tear in the majority of cases is oblique, occasionally transverse tear encircles nearly the whole lower segment Occasionally the tear is vertical

According to Munro Kerr, in pelvic deformity tear is longitudinal but rarely transverse In mal-presentation tear is longitudinal

Carl Henry Devis believes that rupture is commonly in the lower segment As occiput most frequently presents on left side the lower left segment is consequently subjected to special strain during labour and hence rent is usually found in this region It may be longitudinal, transverse, oblique or irregular Greenhill states that rupture of lower uterine segment is usually longitudinal or oblique

Thus everyone differs as far as the site of the tear is concerned

In this series, majority had tear in the lower segment anteriorly in transverse direction These were the cases of obstructed labour due to disproportion or mal-presentation of the foetus Authorities on the subject believe that longitudinal or oblique tears are common In the series under our observation, however transverse tears were common

In all cases of spontaneous rupture edges of the tear were ragged and friable

Treatment

1 Repair of the rent with sation
2 Repair of the rent only
3 Sub-total hysterectomy
4 Tear not sutured
5 Post-mortem finding of

Treatment adopted cases was repair of cases repair with ste 40 cases repair with was done

Books on obstetr terectomy in all cas rus except in very where repair is do is advocated becau rupture uterus ar To keep an infec body is to expo greater risk It is there is definite pregnancies as th again

All these case fected by being time with memb leaking and maj pulated vaginali villages But on sepsis on 4-6 day indicates that sep led by present-da

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...nal Mortality

...ture is one of the most seri-...accidents which can befall a ...rient woman · Mortality has ... estimated by various autho-... from 70-80%

...e chief factors influencing prog-... are

1. Promptness in diagnosis and efficiency of treatment with blood transfusion
2. Time between the rupture and operation
3. The presence or absence of infection
4. Amount of haemorrhage and shock
5. Whether or not rupture took place through caesarean scar Prognosis is best in rupture of a caesarean scar Mortality is lowest when placenta is not situated on the scar for then there is little haemorrhage

There were 30 deaths out of 80 cases, i e maternal mortality of 37% In comparison with other available figures this is a low rate and that too in spite of cases being heavily infected and with no facilities for blood transfusion

No death occurred in cases of rupture of caesarean section scar, in spite of the fact that three had placenta situated on the scar

Causes of death in 30 cases

1	Shock and haemorrhage	21
2	Sepsis	3
3	Post-operative internal haemorrhage	2
4	Disruption of wound	1
5	Rupture with puerperal insanity and sepsis	1
6	Acute dilatation of stomach	1
7	Post-mortem finding of rupture (cause not known)	1

Foetal and Neo-natal Mortality

The chances for the child are very poor in cases of rupture uterus If child has survived upto the time of accident, its only chance of living is afforded by laparotomy, otherwise anoxia, the result of the separation of placenta is inevitable

In caesarean section scar rupture foetal death rate was 4 out of 13 cases

In cases of spontaneous rupture due to obstructed labour foetal death rate is 100%

Neo-natal death occurred in two cases of classical caesarean scar rupture when twins were delivered in both cases In both cases babies expired after few hours

D[illegible] and Eastman	43	cases	53%	maternal	mortality
D[illegible] (1945)	105	„	61.9%		„
[illegible] (1945)	45	„	50%	„	„
[illegible]	—		21 7%	„	„
[illegible]			42.3%		„
S S G Hospital	80	cases	37%		„

D[illegible] and Eastman	43 cases	83%	foetal	mortality
[illegible]	26 „	82%		
D[illegible] (1951)	105	62%		
[illegible] (1945)	45	56%	„	„
[illegible]		62%		
S S G Hospital	80	95%		

TABLE I

Incidence and Results of Rupture of the Uterus

Author	Years	No of cases of uterine rupture	Total deliveries	Incidence of uterine rupture	Maternal mortality	Foetal mortality
Bak and Hyden	1931-53	52	71 483	1 1375	15 4%	53 7%
Beacham and Beacham	1913-50	96	127,522	1 1800	47.9%	79.6%
Brierton	1932-48	57	111 753	1 1916	43.8%	70.8%
Burkons	1941-56	4	34,964	1 8741	10.8%	61.5%
Das Gupta	1950-53	16	30 000	1 1800	32.5%	62%
Delfs and Eastman	1900-44	53	53,574	1 1010	47.1%	80%
Dugger	1931-41	105	318,103	1 3029	61.9%	62%
Erwing	1930-55	37	96,153	1 2598	29 7%	62.2%
Fenny and Barry	6 yrs.	45	54,000	1 1200	15.5%	—
Ferguson and Reid	1925 55	84	101 108	1 1204	5.9%	29 4%
Fitzgerald, Webster and Fields	1928-48	42	92,226	1 2196	54 7%	79.1%
Golden and Betson	1940 58	23	36,200	1 1572	8 7%	41 7%
Gupta	1951 55	11	5,351	1 486.5	25%	—
Harris and Angawa	1948-49	19	2,211	1 117 4	48.5% (out of 33 cases)	—
Lynch	1920-45	44	41 706	1 1118	52%	89%
Maisel	1945 55	11	21,209	1 1929	27.2%	81 6%
Meredith	1921-52	36	57,167	1 1588	11.1%	33.3%
Pedowitz and Perell	1933-54	87	131,229	1 1508	14.9%	33.3%
Subhadra Devi	1943-55	22	13 000	1 590	—	—
Voogd Wood and Powell	1943-55	12	17 181	1 1432	8 4%	—
Patel and Parikh	1955 59	41	51,544	1 1257	27.5%	78%

RUPTURE OF THE UTERUS DURING PREGNANCY AND LABOUR

by

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and

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Incidence "Rupture of the Uterus" is an extremely grave obstetrical complication Its occurrence in institutions varies and depends on the obstetric facilities available in that particular locality The incidence is higher in large institutions where mismanaged neglected cases are sent Table I gives the incidence reported by various writers The incidence varies widely from 1 8741 reported by Burkons to 1 117 4 reported by Harris and Angawa During a period of five years from 1st January 1955 to 31st December 1959 41 cases of rupture of the uterus were treated at the Nowrosjee Wadia Maternity Hospital The total number of deliveries during this period was 51 544 giving an incidence of 1 1257

Age Table II gives the age incidence Majority of the cases are between 21 to 35 years It will be seen from the table that rupture of the uterus is rather rare in the age group 16 to 20 This is due to the preponderance of primiparae in this age group It can also be seen that rupture of the uterus occurs most frequently in the age group 31 to 35 The rarity of rupture of the uterus in the age group of 36 and above is due to less fertility in that age group

Parity The parity distribution in the present series is given in Table III There is only 1 primipara in the series She had a traumatic injury as a result of railway accident It is well known that in a primipara, spontaneous rupture of the uterus usually does not take place even if the labour is obstructed The tendency for a primiparous uterus is to go into inertia rather than to rupture Rupture of uterus in a primipara is either traumatic or a result of misuse of oxytocics Both the cases of uterine rupture in a primipara reported by Golden and Betson were the outcome of traumatic forceps delivery Table IV gives the incidence of uterine rupture in different parity groups It can be easily seen that the incidence of rupture of the uterus markedly increases in the group of parity VI and above

Booked and Emergency Cases As shown in Table V of all the confinements at the hospital only 29 6% were emergency admissions, whereas of the cases of ruptured uterus as many as 51 2% were emergency admissions The incidence of rupture

TABLE II

Age Distribution and Incidence

Age in years	Number of cases of rupture of the uterus	Incidence of rupture of the uterus	5000 consecutive confinements at N.W.M. Hospital during period of study
16-20	3	7.3%	20.1%
21-25	10	24.4%	37.6%
26-30	16	39%	29.6%
31-35	9	21.9%	8.9%
36 and above	3	7.3%	3.8%

TABLE III

Parity Distribution

Parity	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	
No	1	5	9	6	6	6	1	3	2	1	1	Total 41

TABLE IV

Parity Incidence

Parity	Rupture of the uterus	5000 consecutive confinements at N.W.M. Hospital during the period of study
I	2.4%	21.1%
II - V	63.4%	62.9%
VI and above	34.2%	16%

of the uterus amongst booked cases is 1 1815, whereas amongst emergency cases it is 1 726. This emphasizes the fact that adequate antenatal care is very important in the prevention of rupture of the uterus.

Past Obstetric History. Table VI gives the past obstetric history of 40 cases in the series who had previous labours. It is interesting to note that in 27 cases, that is in 64%, all previous deliveries were normal and spontaneous.

TABLE V

Incidence in Booked and Emergency Cases

	Total confinements	Rupture of the uterus	Incidence of rupture uterus
Booked cases	36,300	20	1 1815
Emergency cases	15,214	21	1 726
Total cases	51,514	41	1 1257
Emergency cases as percentage of total	29.6%	51.2%	—

transverse lower segment incision upwards in cases of extreme technical difficulties in extracting the child produces the most insecure scar of all This inverted T-shaped incision can be avoided by extracting the baby by Patwardhan's shoulder method when the head is deep inside the pelvis Even a hysterotomy done before the onset of labour should be with a transverse incision over the lower segment It was noticed by Pedowitz and Schwartz that rupture of the lower segment scar was most common in those patients who at the time of the primary section, had not been in labour or had a labour of less than 9 hours or a labour of more than 30 hours duration and in those in whom the section was performed prior to the 30th week of pregnancy In the last group of patients the lower segment was either poorly developed so that the incision may not have been limited to this segment or the relative thickness of the lower segment at this time favoured poor healing In our hospital as far as possible, classical caesarean section is only done if the patient is to be sterilized

Other scars may be the cause of rupture in pregnancy and labour It myomectomy, the incidence of rupture is the same as in classical caesarean section In this series, we have no case of rupture of the uterus following myomectomy scar

(2) *Abnormal Presentation* The next important etiological group is transverse lie All these cases were emergency admissions These patients were either transferred from small maternity homes or had an obstructed labour at home Such cases are still common at our hospital as although the majority of the patients are conscious of the advantages of hospital delivery, there are still some who prefer to deliver at home

(3) *Cephalopelvic Disproportion* In our series there were 11 cases of cephalopelvic disproportion, where there was either some fault in the pelvis or the babies were unusually large These were all in multiparas where previous deliveries were normal and hence the condition was overlooked Table VIII gives the birth weight of the babies in this series The average weight of the babies born at our hospital is 5 lbs

TABLE VIII
Size of Baby

known to occur even during pregnancy, especially when there is a scar on the uterus Out of the 4 cases which ruptured during pregnancy, one was due to railway accident, 2 had scars on the uterus and one had previous manual removal of placenta When the uterus ruptures during labour it is usually during the second stage In only 9 cases in the present series, the uterus ruptured during the first stage, and in 6 of them there was a scar on the uterus 28 cases ruptured during the second stage It may be noted that out of the 10 cases of rupture of the previous scar on the uterus, in 8 cases the scar gave way either during pregnancy or during the first stage of labour Thus, when there is a scar on the uterus, the uterus ruptures not only more often but is ruptured more easily and with less strain, as can be seen by the fact that the scar easily gives way not only during the first stage of labour but even during pregnancy

Type of Rupture It is customary to divide rupture of the uterus into complete and incomplete variety The former involves all the coats and the latter does not involve the peritoneal coat Table X shows that there were 32 complete ruptures and 9 incomplete ruptures in this series

TABLE X
Type of Rupture

Complete rupture	32
Incomplete rupture	9
Total	41

Site of Rupture Table XI gives the site of rupture in this series.

TABLE XI
Site of Rupture

upper segment or body	5	previous classical caesarean section
Fundus	1	previous manual removal of placenta
Lower segment	35	associated with colporrhexis in 6 and with extention of the rupture to body in 5
Total	41	

There were 5 cases of previous classical caesarean section where the rupture was in the uppe1 segment and body There was one case of a previous manual removal of placenta where the rupture was at the fundus Rupture of the body of the uterus, per se, seems to occur only when it is weakened or damaged previously There were 35 tears in the lower segment—6 were associated with colporrhexis and 5 were associated with extension of the rupture to the body Out of these 36 tears, 20 were on the anterior wall and transverse

In the series of Golden and Betson, left side of the uterus was the more frequent site of rupture In our series, there were only 8 ruptures on the left side as compared to the 10 on the right side It is commonly believed that the left side ruptures more often than the right and various explanations are offered for the same According to Nystrome, due to the physiologic dextrorotation of the gravid uterus there is distention and stretching of the left side of the uterus and hence the more frequent rupture of the left side According to De Lee and Greenhill,

tinuous absorption of toxins as the uterus is left in In recent years, this has been counteracted by the powerful antibiotics and antihistaminics It may be said that by simple suturing a weak scar will be left in to stand future pregnancies and labour, unless the patient is sterilised But suturing is aimed at the survival of the patient in the present crisis, and a patient on whom hysterectomy may be performed, can certainly be sterilized if suturing of the tear is preferred to hysterectomy

Results

Table XIII gives the maternal mortality in our present series of 41 cases 29 mothers were discharged in good health from the hospital There were 12 deaths giving a mortality rate of 29 3% One patient died within a few minutes of admission without any treatment. Hence the corrected mortality rate is 27 5% Two patients expired on the operation table as they were in a very low condition Five patients died of shock within 6 hours of operation Two other patients died of shock between 6-24 hours after operation One patient died on the 4th day due to paralytic ileus and another died on the 7th day due to uraemia One feels that the mortality rate could be reduced by an early diagnosis, quick laparotomy, minimum of handling, rapid transfusions and the liberal use of antibiotics

TABLE XIII
Result *Mother*

Alive	29
Expired	12
Total	41

Table XIV gives the results to the foetus Out of the 41 cases 2 were of less than 24 weeks' gestation Of the remaining 39 cases, 9 babies were born alive They were discharged from the hospital in good condition Out of the remaining 30 cases, one patient died undelivered and there were 29 still-births This gives a foetal loss of 32 in 41 cases, i e 78%

TABLE XIV
Result Baby

Stillborn	29	
Liveborn	9	
Total	38	(+ 2 babies less than 24 weeks + 1 patient expired undelivered)

Discussion

Uterine rupture is, perhaps, the gravest and the most unfortunate complication that an obstetrician runs into, for about one-fourths of the mothers and two-thirds of the babies perish as a result Prevention of uterine rupture is the most important aspect of the problem Proper antenatal care will result in ready recognition and prompt correction of abnormal presentation and in proper management of cephalopelvic disproportion Uterine ruptures resulting from misuse of oxytocics and from operative traumas can be eliminated by hospital deliveries managed by competent obstetricians Even in hospitals, scars on the uterus, obstructed labours and threatened ruptures should be looked upon as potential ruptures and handed over to senior obstetricians Apart from the fact that universal hospital confinements is merely a sweet dream,

version is the commonest culprit When during the course of a difficult internal version, if version suddenly becomes readily possible one should bear in mind the possibility of uterine rupture Difficult forceps deliveries, especially if preceded by manual or instrumental rotation of the head and if carried out through an incompletely dilated cervix, are dangerous to the uterus Uterine rupture caused by operative procedures is usually apparent in one of three ways (i) accidental detection during manual removal of the placenta, (ii) an unhappy finding during routine digital exploration of the uterus after the difficult delivery, and (iii) the patient gradually passing into a state of shock and collapse after the operative interference

An incomplete rupture is usually not accompanied by shock and collapse as against the complete rupture The latter not only results in peritoneal irritation but is more likely to cause severe internal bleeding However, severe haemorrhage into the broad ligament will also result in profound shock

Treatment

The most important factor in the treatment is early diagnosis followed by a quick laparotomy Good surgical facilities blood transfusion antibiotics and proper anaesthesia are all essential for a successful outcome Collins has shown that intra-arterial blood transfusion can save lives where acute blood loss results in profound shock It has been found that 500 c c of whole blood transfused into one of the large pelvic arteries, through an 18 gauge needle directed towards the heart, will restore circulatory equilibrium Intravenous transfusion can then be continued as long as necessary

The actual line of treatment can only be decided after the abdomen is opened up If the tear is small, recent, clean cut and not involving larger vessels, it should be sutured up, preferably with ligature of the fallopian tubes If it is a large irregular tear involving big vessels and extending into the broad ligament it would be advisable to do a quick hysterectomy provided the patient is in a condition to stand this procedure

In our series of 41 cases, in 25 patients suturing was done and in 15 cases hysterectomy was done In one case hardly any treatment was possible as she died within 25 minutes of admission

TABLE XII
Treatment

Suturing of tear	25	
Hysterectomy	15	(total hysterectomy in 1 case)
Died within 25 minutes of admission	1	
Total	41	

According to Gupta, conservative treatment is preferable in our country and the results are better He says that cases of uterine rupture are usually admitted in an extremely low condition due to blood loss, infection and shock He advocated simple suturing under local infiltration and liberal use of antibiotics Bey in his collection, reported in 1932 that the mortality was extremely high where suturing was done He says in such cases there is con-

10 Delfs E and Eastman N J Canadian Med Ass J, 52 376, 1945
11 Duggan J H Surg Clinics N America, 25 1414, 1945
12 Erwing H. W Am J Obst Gyn, 74, 251, 1957
13 Fenny K and Barry A. Brit Med J, 1, 65 1956
14 Ferguson R K. and Reid D E Am J Obst. Gyn, 76 172, 1958
15 Fitzgerald J E. Webster A and Fields J E Surg Gyn Obst. 88 652, 1949
16 Golden M L and Betson R Obst & Gyn 13 506 1959
17 Gupta U P J Obst & Gyn of India, 7, 83 1956
18 Harris B P and Angawa J O W J Obst Gyn Brit Emp 58 1030 1951
19 Kerr M and Moir C Operative Obstetrics (5th ed), Baillere Tindall and Cox
20 Lynch F J Am J Obst Gyn., 49, 514 1945
21 Mackie J E J Obst Gyn Brit. Emp, 59, 838, 1953
22 Maisel F J Am J Obst & Gyn, 72 25, 1956
23 Meredith R W Am J Obst Gyn, 70 84 1955
24 Nystrom C Acta Obst Gyn Scandinav, 35 70, 1956
25 Patwardhan B D and Motashaw N D J Obst & Gyn of India 8 1 1957
26 Pedowitz P and Perell A Am J Obst Gyn, 76 161 1958
27 Pedowitz P and Schwartz R M Am J Obst & Gyn 74 1071 1957
28 Subhadra Devi N J Obst Gyn of India 7 55 1956
29 Voogd D V, Wood H B and Powell D V Obst & Gyn, 7 70, 1956

considering the existing obstetric facilities in our country, uterine ruptures cannot be entirely prevented For with the wider and wider use of caesarean section, the number of cases of rupture of the scar is on the increase It is obvious that repeat caesarean is no answer to the problem, for many scars give way not only very early in labour but also during pregnancy The incidence of scar ruptures can be minimised by avoiding unnecessary sections, choosing a lower segment incision, suturing the uterine incision with due care and preventing and promptly treating sepsis

It can be safely concluded that even with the best of obstetric facilities uterine rupture is liable to occur on occasions Attention must, therefore, be diverted to minimising the dangers of the condition Early diagnosis and prompt treatment can achieve the best results both to the mother and the foetus In view of the varied clinical picture accompanying uterine rupture, mature experience is the only key to early diagnosis The possibility of uterine rupture should be ruled out at the end of every major obstetric manoeuvre The role of prompt and proper treatment in obtaining good results is already referred to and needs no emphasis

Lastly, the present trend of limitation of family will reduce the incidence of rupture of the uterus by preventing 'grand-multiparity'

Summary

(1) 41 cases of uterine rupture treated during a 5-year period at the N W M Hospital have been analysed

(2) The incidence of the condition was 1 1257, the maternal mortality 27 5% and foetal mortality 78%

(3) The possibilities of preventing uterine rupture are discussed

(4) Means of improving the outcome of uterine rupture are considered

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References

1 Ahltorp G Acta Obst Gyn Scandinav , 26, Suppl 6, 1946, quoted by Mackie
2 Bak T F and Hayden G E Am J Obst Gyn , 70, 961, 1955
3 Beacham W D and Beacham D W Am J Obst Gyn , 61, 824, 1951
4 Bey N M J Obst Gyn Brit Emp , 39, 743, 1932
5 Brierton J F Am J Obst Gyn , 59, 113, 1950
6 Burkons H F Obst & Gyn , 7, 675, 1956
7 Collins C G , Frederick B J , Weese W H , Thom J C and Braden F R Am J Obst & Gyn , 74, 465, 1957
8 Das Gupta K. J J Obst & Gyn of India, 6, 371 1956
9 Delee J B and Greenhill J P The Principles and Practice of Obstetrics (9th ed), Saunders, Philadelphia, 1947

TABLE I

Incidence of Operative Deliveries at the Nowrosjee Wadia Maternity Hospital

	Viable confinements	Craniotomies	Incidence of craniotomy	Caesarean sections	Incidence of caesarean section	Forceps deliveries	Incidence of forceps delivery
1st January 1934 to 31st December 1939	29,248	101	0.34%	144	0.49%	379	1.29%
1st August 1954 to 31st July 1959	53 445	113	0.21%	822	1.55%	854	1.60%

CRANIOTOMY

by

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Introduction

What the first ever performed obstetric operation might have been one has only to guess. There is no doubt however, that craniotomy, in one form or other must certainly have been one of the earliest of obstetric operations. In the pre-forceps era craniotomy was the sheet anchor of the management of almost all cases of obstructed labour. With the gradual development of the obstetric science during the last 350 years, the need for craniotomy has slowly decreased to such an extent that today it is one of the rare obstetric operations. It is little wonder, therefore, that almost nothing is written on the subject in recent English or American literature. It is surprising, however that nothing is written on craniotomy in recent Indian literature because in India where obstetric facilities are far from satisfactory the sight of a woman entering the hospital with an obstructed infected and even maltreated labour is by no means very rare. This prompted the author to study the craniotomies performed at the Nowrosjee Wadia Maternity Hospital in recent years.

Incidence

During the 6 year period from 1st August 1953 to 31st July 1959, there were 53,445 viable confinements at the Nowrosjee Wadia Maternity Hospital, 113 of them needing a craniotomy. This gives an incidence of 0.21 per cent. The incidences of caesarean and forceps deliveries during the period of study were 1.55% and 1.60% respectively (Table I). Kushner and Posner (1945) report 19 craniotomies in 22,705 deliveries, an incidence of 0.084 per cent. Long and Stabnick (1940) report 29 craniotomies in 12,292 deliveries, an incidence of 0.235 per cent. The latter authors also quote Bailey and Williamson as reporting 3 craniotomies in 11,491 deliveries, an incidence of 0.026 per cent, and Good as reporting 8 craniotomies in 22,674 deliveries an incidence of 0.360 per cent.

It is interesting to compare the incidences of craniotomy, caesarean section and forceps delivery at the Nowrosjee Wadia Maternity Hospital during the period of study with the corresponding incidences during a 6 year period about 20 years earlier (Table I).

TABLE IV

Past Obstetric Career

All spontaneous normal deliveries	History of caesarean section	History of forceps delivery	History of forceps delivery resulting in stillbirth	History of stillbirth	Nature of previous labours not mentioned	Total
54	7	2	3	9	2	77
	2 also had stillbirths 2 also had spontaneous normal deliveries	1 also had spontaneous normal delivery	2 also had spontaneous normal delivery	4 also had normal deliveries 2 had 2 stillbirths 2 had 3 stillbirths 1 had 4 stillbirths (2 other cases had history of stillbirths but also had history of caesarean section and are included under the latter heading)		

TABLE VI

Indications for Craniotomy

	No of cases
Hydrocephalus	25
Obstructed labour	
Cephalopelvic disproportion	29
Arrested aftercoming head	12
Compound presentation	9
Malpresentation and malposition	9
Failed forceps	7
Outlet contraction	5
Abnormal uterine action	3
Maternal distress	
Eclampsia	6
Antepartum haemorrhage	6
To spare strain on the caesarean section scar	2
Total	113

diagnosis of hydrocephalus was far delayed when breech was presenting

Obstructed Labour Faulty pelvis, large baby, malpresentation, non-obliging cervix and pathological uterine contractions are most important causes of obstructed labour Whatever the cause of the obstructed labour, once it results in fetal death, delivery by craniotomy, if feasible, is the best way of dealing with the situation If the pelvis is not grossly contracted and if the cervix is at least three-fourths dilated delivery by craniotomy should be considered feasible

In all the 29 cases included under the heading of cephalopelvic disproportion, the head was arrested either at the inlet or in the midcavity Ten out of these 29 cases had cord prolapse In two other cases, the cord was presenting and it prolapsed while preparations were being made for caesarean section A vaginal examination to exclude pelvic abnormality, malpresentation and cord presentation should be done in early labour as a routine in all cases where the head is not well engaged

The malpresentations and malpositions encountered in the series were brow presentation 4 cases face presentation 2 cases and occipitoposterior, 3 cases Although spontaneous correction of the malpresentation or malposition and normal delivery can be expected in many cases, cases for spontaneous delivery must be carefully selected in early labour and the progress of labour meticulously observed

There were 9 cases of compound presentation in the series, almost all of them being detected late in labour In the absence of a pelvic contraction, manual correction of the compound presentation is the treatment par excellence But once the condition is neglected and has led to an obstructed labour resulting in fetal death there is no better choice than craniotomy

There were 12 cases of arrested aftercoming head In 6 of these an

Booked and Emergency Admissions

Out of 53 445 total viable confinements 10 609, i e 19 85 per cent were emergency admissions, whereas out of 113 craniotomies, 68, i e 39 82 per cent were emergency admissions (Table V) It can also be seen from Table V that the incidence of craniotomy in booked confinements was 0 105 per cent while it was 0 641 per cent in emergency confinements The incidence of craniotomy is 6 times more in emergency confinements than in booked confinements This is but to be expected in a hospital to which are referred cases of obstructed labour, often from places many miles away the emergency admissions were in very early labour at the time of admission

Indications for Craniotomy

Table VI gives the indications for craniotomy in the present series Apart from 25 cases of hydrocephalus the indications were obstructed labour due to various causes (74 cases), maternal distress (12 cases) and sparing the strain on the caesarean section scar (2 cases)

Hydrocephalus Sixteen of the 25 hydrocephalic babies presented by vertex and 9 by breech Out of the 16 cases with vertex presentation, 4 were diagnosed before the onset of labour 7 were diagnosed early in

TABLE V

Incidence of Craniotomy in Booked and Emergency Cases

	Viable confinements	Craniotomies	Incidence of craniotomy
[illegible]	42,836	15	0 105%
[illegible]	10 609	68	0 641%
[illegible]	53 445	113	0.211%
[illegible]	80 15%	60 18%	—
[illegible]	19 8[illegible]	[illegible]	

TABLE VII

Cause of Fetal Death in Present Series

	No of cases Total	Total
(A) Fetal heart sounds absent on admission		
Cord prolapse	10	
Tight loop of cord round the neck	1	
Antepartum haemorrhage	[illegible]	
Eclampsia	2	
Obstructed labour	32	*Including 4 cases of hydrocephalus
		52
(B) Fetal heart sounds present on admission		
I Fetus moribund on admission		
Obstructed labour	[illegible]	
Obstructed labour + failed forceps	2	
		4
II Hydrocephalic fetus		21
III Fetal heart sounds normal on admission		
Cord presentation	4	
Antepartum haemorrhage	2	
Cord prolapse	3	
Short cord	1	
Incoordinate uterine action	1	
Failed forceps	3	
Failed breech extraction	8	*Preceded by internal podalic version in 3 cases
Obstructed and prolonged labour	6	
Unknown	6	
		31
(C) Craniotomy done on living normal baby		2
Total		113

bund condition on admission In 2 of these the fetal heart sounds disappeared soon after admission and in the remaining 2 they disappeared during a failed attempt at forceps delivery

In 57 cases fetal heart sounds were normal on admission If 21 cases of hydrocephalus are excluded 14 with forecoming head and 7 with aftercoming head, there remain 36 cases In 12 of these 36, fetal heart sounds suddenly disappeared during first stage of labour due to cord presentation 4 cases antepartum haemorrhage, 2 cases unknown cause, 6 cases In 3 other cases the fetal heart sounds suddenly disappeared due to cord prolapse in second stage of labour In 1 case incoordinate uterine action was responsible for fetal death and in 1 other short cord In 3 cases the fetal heart sounds disappeared during failed forceps extraction In 8 cases the fetus died during failed breech extraction which was preceded by internal podalic version in 3 cases In

incompletely dilated cervix was the cause of obstruction while in 6, cephalopelvic disproportion was responsible for the obstruction Out of the 12, in 3 cases a deliberate breech extraction was resorted to and in 3 others the breech extraction was preceded by internal podalic version The fact that before undertaking a breech extraction the adequacy of the pelvis and the dilatation of the cervix must be carefully assessed needs no emphasis

There were 7 cases of failed forceps in the series In 1 of these, caesarean section was granted to be the treatment of choice but for the moribund fetus As the moribund fetus was not considered worth a caesarean section, forceps delivery was undertaken In the remaining 6 cases, however, some factors unrecognised before the forceps application led to the failure of forceps extraction This emphasises the need for careful evaluation of the pelvis, by a radiological study if necessary, before undertaking any midforceps delivery

In 5 cases in the series, contracted outlet was the cause of obstructed labour A minor degree of outlet contraction is notorious for evading clinical recognition until too late in labour But it must be pointed out that even a greater degree of outlet contraction can be easily missed unless it is positively looked for as a routine practice

There were 3 cases of abnormal uterine action in the series Pathological uterine contractions can by themselves cause fetal death by interfering with placental circulation it is only in recent years that due attention is being paid to uterine action, an important factor in any labour

Maternal Distress Increasing maternal distress is a valid indication for terminating any labour and if the fetus is dead, craniotomy is the best choice In the present series, there were 12 cases of craniotomy done for maternal distress (eclampsia, 6 cases, placenta praevia, 3 cases and accidental haemorrhage, 3 cases) The fetus was dead in each of these 12 cases

To Spare Strain on Caesarean Scar In this series there were 2 cases of previous caesarean section where the fetus died unexpectedly during the first stage of labour In these 2 cases craniotomy was performed at the beginning of the second stage of labour with the idea of reducing the strain of the second stage on the caesarean scar In both instances, spontaneous vaginal delivery could have resulted if craniotomy were not done

Cause of Fetal Death

Table VII gives the causes of fetal death in the series

In 52 cases out of 113, the foetal heart sounds were absent on admission The cause of fetal death in these 52 cases was as follows cord prolapse, 10 cases, tight loop of cord round the neck, 1 case, antepartum haemorrhage, 7 cases, eclampsia, 2 cases, obstructed and prolonged labour, 32 cases, including 1 case of failed forceps, 4 cases of failed breech extraction (2 due to hydrocephalic aftercoming head) and 2 cases of forecoming hydrocephalic head

In 4 cases admitted with obstructed labour the fetus was in a mori-

the perforator are too wellknown to need a mention

Lastly, one must make it a rule to destroy the medullary centres, in each and every case, especially so if there is hydrocephalus It is, however, practically impossible to reach and destroy the medullary centres in aftercoming heads Fortunately, it is a matter of minutes before a baby with arrested aftercoming head breathes its last In this series 4 hydrocephalic babies had a miserable existence of a few hours to few days after birth One other baby which was normal, though expected to be mildly hydrocephalic, lived for about an hour after birth One only has to witness such a pitiable baby, to wish no obstetrician ever be cursed with such a sight

Anaesthesia for Craniotomy

In this series open ether anaesthesia was given to 29 cases out of which in 13 cases the anaesthesia was given for procedures which preceded craniotomy, viz internal podalic version in 6, breech extraction in 1 attempts at forceps extraction in 5 and attempt at reposition of the hand in 1 Besides this, in 2 cases pudendal block anaesthesia was given while in one other case saddle block anaesthesia was given No anaesthesia was needed in 81 cases

When the head is in the midcavity, it can be easily perforated without any anaesthesia However, if the head is above the brim anaesthesia not only spares the patient of much discomfort but also facilitates the operation to a great extent

TABLE VIII

Mode of Delivery following Craniotomy

	No of cases	
Immediate extraction by traction on the head with bulldog forceps	36	
Immediate extraction by traction on the breech in cases of aftercoming head	20	(including 9 hydrocephalus)
Spontaneous delivery with or without traction on the collapsed head during pains	39	(including 16 hydrocephalus)
Cephalotripsy	2	(in 2 others cephalotripsy was tried but it failed)
Caesarean section	3	(in 2 cases after failed cephalotripsy)
Forceps extraction	2	(1 case of failed forceps and 1 of aftercoming head)
Shoulder delivery under intravenous pentothal	1	
Bilateral cleidotomy	1	
Internal podalic version	1	
Extraction by traction on the head with bulldog forceps after awaiting for spontaneous delivery	2	
No mention	6	
Total	113	

6 cases the fetus died due to obstructed or and prolonged labour Lastly, in 2 cases fetal heart sounds were present at the time of craniotomy These two cases demand some clarification In one of these there was a compound presentation, viz head and hand, with a moribund fetus The hand could not be reposed under anaesthesia and craniotomy was resorted to as the dying fetus was not considered worth a caesarean section In the second case, a mild hydrocephalus was suspected to be the cause of obstructed labour An X-ray study was not decisive in excluding hydrocephalus Attempts at forceps delivery having failed craniotomy was resorted to, even though the fetal heart sounds were present Unfortunately, this baby was not hydrocephalic

Technique of Craniotomy

In cases of hydrocephalus, in this series, perforation with a trocar and canula through the sutures or fontanelles was found adequate in all cases except in 3 cases in which Simpson's perforator had to be used — in 1 case through the palate, and in 2 cases through the occipital bone Even though there were four hydrocephalic babies with spina bifida and breech presentation it is surprising that in none was the cerebro-spinal fluid tapped through the spinal canal Even in the absence of spina bifida the after coming hydrocephalic head can be easily tapped through the spinal canal after deliberately opening it for the purpose This simple technique should be a rational procedure of choice to the perforation of the head Mention must be made here of the abdominal tapping of a hydrocephalic head advocated by Walsh (1933) Besides being the only available method when the hydrocephalic head is inaccessible vaginally, it is of advantage in cases which are not in labour Usually, abdominal tapping in the latter cases will also result in the onset of labour

In perforating a normal head, exacting details about the site of perforation no longer need a consideration for the obvious reason that we do not, today, undertake a craniotomy if the head is likely to need crushing before it can be extracted A cruciate opening in the head through whatever part that can be easily reached is good enough for our cases today

While perforating a high aftercoming head, one sometimes is faced with difficulty in reaching the head One can in such cases resort to Gustafson's (1939) recommendation of passing the perforator under the skin of the baby's neck, which gives safety to the maternal parts during the perforation This was resorted to in 3 cases in the series When using this method one must however, try to perforate the head as away from the foramen magnum as possible, or else there is a danger of dislocation of the atlanto-occipital joint, which makes the situation far more difficult to tackle

The head must be well fixed during perforation to avoid the slipping of the perforator off the head The forecoming head is best fixed by an assistant per abdomen while the aftercoming one is best fixed by traction on the legs by an assistant The usual precautions in handling

tion Lastly, one case of impacted brow, who was in labour for 4 days prior to her admission was submitted to perforation of the head and later to failed cephalotripsy She was ultimately delivered by caesarean section but died due to severe shock 5 hours after delivery In no case was craniotomy responsible for the death of the mother

Morbidity

TABLE IX

Morbidity in Present Series

	No of cases
Vesicovaginal fistula	3
Severe puerperal sepsis	5
Urinary sepsis	1
Gaping of episiotomy wound	1
Bilateral thrombophlebitis	1
Anuria and paralytic ileus	1
Jaundice on the 3rd day	1

Table IX gives the morbidity in the series Almost all of this morbidity was the legacy of the prolonged obstructed and infected labour preceding the craniotomy which, per se was not responsible for any morbidity, including the vesico-vaginal fistulae But for the free use of antibiotics, the morbidity would certainly have been much more

Comments

There is a great paucity of the literature on the subject in recent years and no large series of cases is available for comparison The incidence of craniotomy in the present series viz 0 21 per cent, can certainly be considered a high one and speaks of the obstetric facilities, rather the lack of them in the area the hospital serves A look at the indications is enough to convince one that majority of the craniotomies in the present series, apart from cases of hydrocephalus, could have been prevented by better and prompt obstetric service outside the hospital In general the better the obstetric care available, the less frequent will be the occasion for performing a craniotomy Yet, whatever perfection prenatal care may achieve and intranatal management may attain a sudden, unexpected and sometimes unexplained intrauterine fetal death will occur on occasions and may necessitate a craniotomy Besides hydrocephalus will remain as a definite indication for craniotomy until we find a perfect remedy for the condition in the newborn or it as an entity is wiped out

It should be emphasised again that in cases of obstructed labour with dead fetus, delivery by craniotomy, if feasible, is the best treatment When craniotomy is indicated there should be no hesitation in undertaking it There is one case in the present series which proves the futility of avoiding a craniotomy

Mode of Delivery after Craniotomy

Table VIII gives the mode of delivery after the head was perforated Only two things need an elaboration here The first is that cephalotripsy had to be resorted to in only 4 cases, successfully in 2 and unsucessfully in 2 Cephalotripsy is now so rarely performed that it is difficult to find an obstetrician who has acquired the experience and skill necessary for the operation The formidable operation of cephalotripsy is now almost extinct and when one feels that craniotomy will have to be followed by a cephalotripsy one should desist from doing a craniotomy For in such cases, with present-day facilities, a caesarean section is far safer than cephalotripsy Whether an extraperitoneal caesarean section should be done by choice will depend entirely on the obstetrician But, howsoever strong may be one's faith in the virtues of extraperitoneal caesarean section, one can rest assured that even an intraperitoneal caesarean section is far safer than a difficult cephalotripsy Secondly, caesarean section had to be undertaken after craniotomy in 3 cases, including the 2 in which cephalotripsy had failed This emphasises the need for proper assessment of the pelvis before craniotomy is undertaken The mere fact that the fetus is dead should not by itself compel one to do a craniotomy It is good to spare the patient of a caesarean section when she cannot be given a live child but caesarean section in occasional unfortunate cases is the treatment of choice even if the baby is dead It need not be considered improper obstetrics

Contraindications

This brings one to an important point as to when a craniotomy is contraindicated Gross contraction of the pelvis which is not likely to allow the passage of even a perforated head without the formidable crushing procedure should, today, be a contraindication for craniotomy Besides this, rigid cervix and pelvic tumours, bony or otherwise, causing the obstruction are other contraindications Lastly, a live normal baby, should always be a contraindication unless the baby is dying or moribund

Complications During the Third Stage

Nine cases had post-partum haemorrhage, 6 of them needing a manual removal of placenta and 2 needing a packing of the uterus Four other cases had retained placenta and required manual removal of the placenta In 7 other cases manual removal of the placenta was done rather because the patients were under open ether anaesthesia at the time of delivery of the baby

Mortality

Five patients in the series died Two died of eclampsia and its aftermath, one 22 hours and the other 4½ hours after delivery One patient died 7 hours after delivery, due to severe concealed accidental haemorrhage One patient, who was admitted unconscious with evidence of peritonitis and died after delivery, showed evidence of peritonitis and of diffuse haemorrhagic necrosis of liver at the post-mortem examina-

SEX DETERMINATION OF FOETUS FROM LIQUOR AMNII

by

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Much work has been done on determination of sex by cytologic tests in foreign countries These tests have important theoretical implications in the study of sex differentiation. Genetic sex can be recognised by different arrangement of chromatin according to sex in epidermal nuclei in skin biopsy The epithelial nuclei of the female contain a mass of sex chromatin which is inconspicuous in the nuclei of male (Moore et al 1953, Emery and McMillan 1954) and is thought to be formed by the heterotropic portions of two X chromosomes The XY chromosomes of male nuclei do not form such a mass (Moore and Barr 1955) This fact has been used as an aid in the differential diagnosis of errors of sex development such as hermaphrodism and gonadal dysgenesis (Moore *et al* 1953, Barr 1954, Polani *et al* 1954) As nuclei of epidermis are similar in this respect to those of other human tissues (Moore and Barr 1954), oral and vaginal smears were tried so as to simplify the cytologic sex determination (Moore and Barr 1955, Marberger et al 1955, Carpentier et al 1955) This in turn suggested that sex of foetus in utero might be diagnosed by examining sex chromatin in the nuclei of desquamated skin-cells in liquor amnii, because all such cells are of foetal origin and the incidence of sex-chromatin body is independent of the hormonal milieu (Makowski et al 1956) We were encouraged to use this method in a series of 138 pregnant women as several investigators (Makowski et al 1956, Dewhurst 1956, Sachs et al 1956, Keymer et al. 1957, Shettles 1956, Fuchs and Riss 1956) have tried it successfully and obtained 100% correct results

Paper read at Bombay Obstetric & Gynaecological Society on 18-2-60

Material and Method

Liquor amnii was obtained by paracentesis uteri before or after the onset of labour A wide-bore lumbar puncture needle was used for the paracentesis, after infiltrating the abdominal wall with novocaine, taking all the necessary aseptic precautions About 5 ml of the collected fluid was centrifuged and the supernatent fluid was poured off A thin smear was prepared from the sediment on the slide previously coated with Mayer's egg-albumin The slide was immediately fixed, while still moist, in modified Davidson solution (Moore et al 1953), which consists of 20 parts formaline (analytical reagent), 30 parts of 50% alcohol, 10 parts glacial acetic acid and 30 parts

when it is indicated A fifth para, with one full-term normal delivery followed by 3 full-term stillbirths, was admitted with prolonged and obstructed labour, the brow presenting The fetal heart sounds were absent, the cervix was fully dilated and the presenting part was at the brim A craniotomy was clearly indicated Yet for strange reasons an internal podalic version was performed instead The aftercoming head was arrested at the brim and ultimately had to be submitted to craniotomy

Let us imagine for a moment that the operation of craniotomy were not at our disposal Majority of the cases in the present series would then have had to be delivered by caesarean section One can readily realise the great morbidity and even some mortality that would have followed caesarean sections in these infected cases On the other hand, there is no morbidity or mortality attributable to craniotomy in the present series How very useful is craniotomy under the circumstances? The safety of craniotomy is its greatest virtue

In conclusion, as long as women continue to deliver vaginally, the operation of craniotomy will have a small but worthy place in our obstetric armamentarium

Summary

(1) The operation of craniotomy is rather a rarity in modern obstetrics

(2) At the Nowrosjee Wadia Maternity Hospital, during a 6 year period from 1st August 1953 to 31st July 1959, there were 113 craniotomy among 53,445 viable confinements This gives an incidence of 0 21 per cent

(3) An analytical study of these 113 craniotomy is presented here

(4) The usefulness and safety of craniotomy is emphasised

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References

Gustafson G W Amer J Obst Gyn, 38, 522, 1939

Kushner J I and Posner A C Amer J Obst Gyn, 50, 95, 1945

Long J P, Jr and Stabnick J S South M J, 33, 1073, 1940 (Quoted by Kushner and Posner)

Walsh C H Tran N E Obst Gyn Soc, p 30, 1933

omitted Sex chromatin mass consisted of a densely stained, plano-convex rounded or flattened mass lying adjacent to the inner side of the nuclear membrane, and the incidence of cells containing this was then obtained If the incidence was between 0-4%, the sex of the foetus was inferred to be male, while if it was between 15-80%, the sex was inferred to be female Sex of the new born infant was later established on the basis of external physical examination

Results

Out of the 138 samples of amniotic fluid aspirated, 47 were not suitable for study because of the insufficient number of nuclei for the prediction to be made Rejection percentage was thus 34 Quite often the samples were blood-stained, which might have been due to slight bleeding at the time of puncture and not during aspiration We tried to determine the sex of foetus even from blood stained samples, and out of 22 such samples prediction was possible in 10 In others the cells were not sufficient to carry out the test Occasionally, staining of the smear was not satisfactory and the cells suitable for diagnosis were not enough Out of the 138 fluid samples, 11 were thus discarded As the samples were not preserved, the tests could not be repeated afterwards Sometimes a number of white blood corpuscles were seen in the smear, which made the prediction rather difficult



Discussion

Several investigators have tried to determine sex of foetus from amniotic fluid and they give different ranges for sex chromatin mass for males and females

TABLE I

No of fluids aspirated	No of fluids from which sex was diagnosed and confirmed	No of fluids from which sex could not be diagnosed	Sex diagnosed from the fluids but not confirmed after birth as patient delivered outside the hospital
138	79	47	12

TABLE II

Smears	Male	Female	Correct	Error	% correct	% error
79	39	40	73	6	92	8

of distilled water The period of fixation varied from 24 to 48 hours after which the slide was rinsed in distilled water and stained by modified Feulgen technique (Lillie 1954) consisting of the following steps

(i) Rinsing the slide in HCl (sp gr 1 19) for one minute
(ii) Hydrolysing in 1 N HCl at 58° C for 8-12 minutes
(iii) Rinsing in cold N HCl for one minute
(iv) Staining in Fuchsin sulfurous acid * for 2 hours
(v) Passing thrice through acid bleaching solution (200 c c distilled water, 10 c c 10% aqueous potassium metabisulphite, and 10 c c 1 N HCl), keeping the slide for 2 minutes in each
(vi) Rinsing in ordinary and distilled water for 3 minutes each
(vii) Dehydrating in 50%, 70%, 95% and absolute alcohol, 2 minutes each
(viii) Cleaning twice in xylol and mounting in Canada balsam

* Fuchsin sulfurous acid was prepared as follows

Dissolve 0 5 gm basic Fuchsin in 100 c c boiling distilled water Cool the solution to 50°C , filter, and add 10 c c N HCl and 1 gm potassium metabisulphite, shake, close tightly in a chemically clean bottle and store in dark for 24 hours Add 0 5 gm neutral activated charcoal, shake, and filter

The Fuelgen method of staining is specific for desoxyribose nucleic acid, a chemical constituent, that is found only in chromosomes and therefore gives a clear staining for the sex chromatin mass (Sachs et al 1956) In this method the nucleal reaction is believed to depend upon uncovering of potential aldehyde group of desoxyribose by hydrolysis of purine desoxyribose bonds by HCl The uncovered aldehyde group gives the Schiff reaction when treated with leuco-basic Fuchsin Hydrolysis with HCl is thus a very important step in the Feulgen method, and the intensity of stain varies with the duration of hydrolysis, increasing to certain maximum and then decreasing as the hydrolysis proceeds (Kurnick 1956)



Photomicrograph showing the epithelial cells containing densely stained plano convex sex chromatin mass lying adjacent to the inner side of the nuclear membrane

The mounted smears were studied under oil immersion The nuclei were found to be stained bluish red 100 well stained nuclei were counted, while the rest of the poorly stained, badly fragmented or markedly pyknotic nuclei were

Naik, M Sc, and Dr P N Shah M.D, of Indian Cancer Research Centre, Bombay, for their valuable guidance during the investigation

References

1 Barr M. L. Surg Gyn Obst, 99, 184, 1954
2 Caldeyro-Barcia R and Alvarez H. J Obst Gyn Brit. Emp, 59, 646, 1952
3 Carpentier P J, Stole L. A. M. and Visschers K. P Lancet, 2, 874, 1955
4 Dewhurst C J Lancet 1 471 1956
5 Emery J L and McMillan M J Path, and Bact, 68, 17, 1954
6 Fuchs F and Riss P Nature 177 330, 1956
7 Keymer E., Silva Izanza E and Coutts W E Am J Obst & Gyn, 74, 1098 1957
8 Kurnick N B International Review of Cytology, 4 235, 1955
9 Kurtz Bull. Margret Hague Mat. Hosp, 10 71, 1957 (Quoted from Year Book in Obstetrics and Gynaecology, 1959-60, p 89)
10 Lillie R. D Histopathologic Technique and Practical Histochemistry, p 132 Blackiston Co Phila 1954
11 Makowski K L., Prem M A. and Kaiser I. H Science 123, 542 1956
12 Marberger E., Boccalla, R A and Nelson W O Proc. Soc Exp Biol. and Med, 89 488, 1955
13 Moore K. L. and Barr M L Acta anat, 21, 197, 1954 As quoted by (14)
14 Moore K L. and Barr M L. Lancet, 2 57, 1955.
15 Moore K L, Graham, M. A and Barr M. L. Surg Gyn Obst. 96, 641 1955
16 Polani P E, Hunter W F and Lennox B Lancet, 2, 120, 1954
17 Sachs L, Serr D M. and Danon M. Br Med J, 2, 795, 1956
18 Shettles L B Am J Obst and Gyn, 71, 834, 1956

TABLE III

Names of investigator	No of cases investigated	% correct	Range of sex chromatin mass	
			Male	Female
Makowski, Prem and Kaiser	30	100	10%	59%
Dewhurst	13	100	not given	
Sachs, Serr and Danon	47	100	4%	35%
Keymer, Silva Izanza and Coutts	15	100	1-10%	14-70%
Sheetles	40	100	—	28-65%
Fuchs and Riss	25	100	not given	

The range that we followed was that of Sachs, Serr and Danon Although some of the authors, who have determined sex of foetus from amniotic fluid, do not give the range of sex-chromatin mass present in male and female nuclei, and although the ranges given by different authors differ, the values do not overlap and the sex could be determined according to any of the ranges Minimum incidence of sex-chromatin masses among female nuclei is approximately twice the maximum incidence among male nuclei

Aspiration of fluid did not have any mild or severe consequences, such as onset of premature labour None of the authors have recorded such mild or severe consequences except Dewhurst, who aspirated pure blood in one case, and whose one patient went at once into premature labour at the 36th week of gestation But this did not result in serious consequences We agree with almost all authors that transabdominal needle puncture when done with reasonable care is not dangerous to either mother or child It may be added that paracentesis uteri has become an established technique for recording intra-amniotic pressures during pregnancy and labour following the work of Caldeyro-Barcia and Alvarez Recently paracentesis uteri has been advised in the differentiation of hydatidiform mole from normal pregnancy by Kurtz Paracentesis uteri used for whatever purpose is thus safe

Still this method of sex determination cannot be suggested as routine procedure, and its use should be limited only to parents who are eager to know the sex of the child early during pregnancy Regarding the clinical value of correct prenatal diagnosis of sex, the most obvious application would be in cases of certain sex-linked abnormalities It could also be useful in determining the sex of aborted foetus and thus in determining the rate of abortion in male and female foetus

Conclusion

Sex of the foetus can be determined correctly from a well-stained preparation of amniotic fluid obtained by transabdominal puncture of foetal membrane When done with reasonable care, this procedure is not dangerous to either mother or child

Acknowledgment

Our thanks are due to Mr S N

certain characteristics that make its identification possible It is a sharply defined plano-convex body, usually lying against the inner surface of the nuclear membrane, and consists of desoxy-ribo-nucleic acid The size of the sex chromatin is about 0 7 μ x 1 2 μ The sex chromatin is believed to be formed as a result of the fusion of heterochromatic portions of the two X-chromosomes of female intermitotic cells to form one conspicuous mass of chromatin. It is present in about 75% of female cells and in the male a similar or rather smaller chromatin nodule may be found under 10% of the nuclei Further studies have shown that sex chromatin may be demonstrated in the various tissues of human and some animals This subject has recently been reviewed (Baruah, 1960)

In man, the sex chromatin was first observed in the skin biopsies (Moore et al, 1953) and since then most human tissues have been investigated More recently, it has been found in the smears from the buccal mucosa of newborn infants (Moore and Barr, 1955, Marberger et al 1955 Dixon and Torr, 1956) and from the vaginal wall (Carpentier et al, 1955) and this has brought nuclear sexing into the field of exfoliative cytology It has also been demonstrated in the cell nuclei of the amniotic membrane in cats (Graham, 1954) and in early human embryo and foetus (Glenister, 1956)

The recognition of definite sex chromatin mass in the nuclei of epithelial cells in oral and vaginal smears in every female and the accuracy with which the sex can be ascertained cytologically prompted the study of the nuclear morphology of cells in human amniotic fluid in relation to sex of the offspring The technical concept appears to be directly applicable to the desquamated cellular debris in amniotic fluid and since all such cells are of foetal origin, it should be possible, therefore, to establish the genetic sex of the foetus 'in utero' by this method Since the original report by Sachs et al (1955), various workers e g Shettles (1956) in New York, Fuchs and Riis (1956) in Copenhagen, Makowski et al (1956) in Minneapolis James (1956) in Amsterdam and Dewhurst (1956) in Sheffield, have found independently that a diagnosis of foetal sex can be correctly made from examination of amniotic fluid cells

Using the same technique in our laboratory we have been able to diagnose accurately, the sex of the foetus before birth

Method

Liquor amnii was obtained (R.K B) by artificial high rupture of the membranes with Drew Smythe catheter during induction of labour in some selected cases of prolonged pregnancy About 10 c c of fluid was collected Care was taken to avoid admixture of maternal cells The fluid was centrifuged, the vernix and the supernatant fluid were discarded The sediment cells were spread on a slide, previously coated with egg albumin and fixed at once in Papanicolaou's fixative (equal parts of 95% ethyl alcohol and ether) for 2 to 24 hours while still moist After fixation the slides were stained by haematoxylin and eosin

PRENATAL DIAGNOSIS OF SEX USING CELLS FROM THE AMNIOTIC FLUID

(A Preliminary Report)

by

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There has always been a natural curiosity of people, specially of the parents, to know the sex of an expected child For many years attempts have been made to develop a reliable method for antenatal sex determination by different approaches

Many have professed their ability to predict this by various criteria, e g whether the baby is carried "all at the back" or "all at the front", whether a needle suspended over the abdomen rotates clockwise or widdershines, and when in the menstrual cycle, the child is supposed to have been conceived There is also mention in Egyptian Papyrus "Another test for a woman who will bear or a woman that will not bear Wheat and spelt Let the woman water them daily with her urine If they both grow it will bear if the wheat grows, it will be a girl If neither grows she will not bear"

The more scientific methods have been based on the foetal heart rate X-ray for foetal scrotal shadow, radiography of the foetal lumbar vertebra, which shows a coronal cleft only in male children, the excretion of 17-ketosteroids in the urine, the changes in the saliva or cytology of vagina of the mother None of them, however, has stood the test of time and all failed to receive sufficient confirmation for general acceptance

It has been known that sex determination is related to a pair of chromosomes that differ according to the individual's sex When the early work on insects was extended to other animal forms and human beings, it was found that the sex determining mechanism depends on females having the XX and males the XY sex-chromosome-complex

Barr and Bertram (1949) first demonstrated sexual differences in the morphology of intermitotic nuclei in the nerve cells of the female cat and it has come to be known as the "sex chromatin" The sex chromatin has

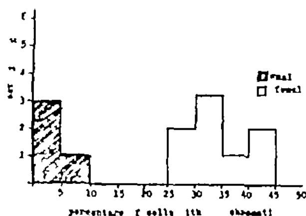


Fig 2
Histogram showing percentage of cells containing sex chromatin in the amniotic fluid from 12 cases. The figures have been grouped at intervals of 5

females Since there is no erroneous diagnosis, these observations are highly significant

Comment

It seems clear from these results that with careful study of a properly prepared and stained specimen from the amniotic fluid, a correct forecast of the sex of the foetus is possible Difficulties in interpretation are due to cell shrinkage, simulating sex chromatin mass and to debris partly obscuring nuclear detail In all cases there have been a sufficient number of diagnosable cells, but the search for sufficient number of nuclei with good definition is very arduous and time consuming

The possible sources of origin of the cells in the amniotic fluid include the skin, gastro-intestinal, respiratory and genito urinary tracts, umbilical cord and amnion Tissues and smears from each of these sources have been found to contain in females the typical sex chromatin mass (Marberger et al, 1955, Moore and Barr, 1954, 1955) The degree of variation in morphology of the cells in the amniotic fluid is in agreement with the possible multiple sources of their origin, however, the nuclear chromosomal constitution is identical

Sachs et al (1956) using Papanicolaou stain found 3 main types of epithelial cells in the amniotic fluid, which they classified as basal, precornified, and cornified and keratinized cells The basal and precornified cells with green staining cytoplasm are the most suitable for sex diagnosis and are derived principally from the oral and vaginal mucosa and epithelium of the amniotic membrane The cornified and keratinized cells with pink and orange staining cytoplasm probably come from the skin surface and are unsuitable, since their nuclei show different kinds of degeneration, such as pyknosis, loss of stainability and karyorrhexis According to Sachs et al (1956), the percentage of diagnosable cells in the amniotic fluid smear is about 12% for both males and females

Most workers have relied chiefly on the amniotic fluid obtained just prior to delivery Others obtained liquor amnii by paracentesis uteri between the 32nd and 36th weeks of pregnancy (Dewhurst, 1956), or at caesarean section Aspiration of a small volume of amniotic fluid from a pregnant uterus can also be performed by abdominal or vaginal puncture of the membranes through the uterine wall A diagnosis can be made from the 3rd month and possibly earlier Even a diagnosis has been made on the cells in the fluid obtained by abdominal puncture of

Papanicolaou and Giemsa stains and all gave good results

The smears were examined by one of us (B D B) under oil immersion objective without any prior knowledge of the foetal sex at the time of counting About 50 to 100 cells were counted The presence of a dark staining plano-convex mass in contact with the nuclear membrane was taken as indicating the presence of sex chromatin and its percentage was determined The diagnosis of sex was based on determination of the percentage of cells in the male, it is less than 5% and in the female, it is 30-50% of the nuclei counted The sex of the new-born infant was established on the basis of external physical examination

Observations

Amniotic fluid smears from 12 cases were examined It has been found that many of the nuclei in the amniotic fluid debris were not suitable for identification of the sex chromatin body Some were so markedly pyknotic and shrunken, too densely stained, or those overlapped by other structures that nuclear detail could not be discerned While others were degenerated, distorted, took the stain poorly or were badly fragmented In every smear, however, there were sufficient nuclei, in which the nuclear detail was clear to allow a definite distinction between male and female cells by the absence or the presence of the typical sex chromatin mass in the cell nuclei as in other tissues

In all these 12 cases (4 male and 8 female), the sex of the foetus was predicted correctly In smears from cases where females were subsequently born, typical sex chromatin was found in 25-40 8% of the nuclei suitable for study (Fig 1) While



Fig 1
Photomicrograph of a cell from the amniotic fluid smear Note the compact mass in contact with the nuclear membrane, indicating female sex H.E x 1500

in smears from cases where males were subsequently born, only 4 2-7 8% showed such an arrangement Fig 2 shows the incidence of the sex chromatin in the amniotic cells in these cases It may be seen that the mean incidence of sex chromatin in the nuclei found in the fluid of female foetuses (32%) is several times that found in male foetuses (4%) and there is no overlap between the maximum counts on male foetuses and the minimum on

AMENORRHOEA ASSOCIATED WITH RETENTION OF FERTILITY

by

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It is extremely unusual to notice women who have never menstruated and still conceived several times during their reproductive period The cyclical endometrial changes in such cases would continue but bleeding is not exhibited as an external sign of menstruation Rarely, such cases are reported and properly investigated to find out the underlying disturbed function

It is theoretically possible that regular cyclical changes may take place, ovulation may occur, but due to certain vascular defects, bleeding may not be shown at the end of the cycle The cyclical changes in these individuals can be demonstrated by endometrial biopsies and vaginal smears This sort of cycle is normally seen in Macaque monkey

Case Report

Mrs G B., age 38 years came for advise and treatment of obesity Her weight was 208 lbs and she was getting slightly breathless after climbing the staircase She had no other physical complaints She had been married 15 years and had no children She had no history of major sickness in childhood or at the adult age She gave history that she had never menstruated throughout her life even though several times hormone therapy was given to her Now as age was advancing she was worried whether she would ever bear a child She was getting a lump in the left breast off and on for the last three years for which biopsy was taken which showed absence of any malignant lesion but only glandular hyperplasia

Clinical Examination

The external genitals were quite normal Vaginal examination showed uterus to be of slightly smaller size than the normal It was anteverted and mobile The fornices were clear and cervix was quite normal Palpation did not reveal any abnormality in the true pelvis

Investigations

The basal temperature was taken which showed insignificant rise of temperature and revealed irregular signs of ovulation on rare occasions only B M R test was minus eleven and thus showed that metabolism was slightly reduced Repeated endometrial biopsies mostly showed proliferative pattern On one single occasion a secretory pattern was noticed Husband s semen analysis was within normal limits and showed nothing abnormal

Personal History

During the last seven years she was treated with estrogens progesterone gonadotrophins and thyroid But after the treatment very rarely she showed a spot of blood as a menstrual discharge

Her marital life was quite happy and there were no coital difficulties or personal discord

Family History

She had two sisters both enjoying perfectly normal health one had two children and the other had three children at

an 8 weeks' old aborted embryo (Sachs et al 1956)

It therefore indicates that this method is quite reliable and the only possible source of error would seem to be, and this can be ignored for practical purposes, is the rare case of an intersex, in which the sexual phenotype does not correspond to the sex chromosome constitution

For this test to have any practical value, it is necessary for the liquor amnii to be obtained with perfect safety sometime before term But uptil now no method of doing this by other than paracentesis uteri seems possible Although this has been carried out often for therapeutic and experimental reasons without accidents, mere curiosity does not justify the procedure for widespread general use, to discover a child's sex, which would soon be known for certain, because of the risk of inducing premature labour or causing foetal injury Thus its practical value is limited in the human at present It is a subject, which may excite some popular interest and may have applications beyond the mere satisfaction of parental curiosity in future However, it has clinical value in dealing with certain rare sex-linked and blood-group-linked hereditary disease In such cases, it is important to know the correct sex of the foetus in order to determine its chances of manifesting the disease at a stage, when pregnancy can safely be interrupted It is also possible to apply this method in veterinary practice

Summary

A reliable prenatal diagnosis can be made from the study of the sex chromatin in the nuclei of exfoliated cells of the foetus in the amniotic fluid

Specimens of amniotic fluid were examined from 12 cases and the sex of the foetus was correctly diagnosed in all

The application of this technique in clinical medicine is discussed

Acknowledgement We wish to express our thanks to the Principal and Superintendent, Assam Medical College, for permission to publish this paper

References

Barr M L and Bertram E G Nature, 163, 676, 1949

Baruah B D Antiseptic, September, 1960

Carpentier P J, Stolte L A M. and Visschers G P. Lancet, ii, 874, 1955

Dewhurst C J Lancet, i, 471, 1956

Dixon A D and Torr J B D Brit Med Jour, ii, 799, 1956

Fuchs F and Riis P Nature, 177, 330, 1956

Glenister T W Nature, 177, 1135, 1956

Graham M A Nature, 173, 310, 1954

James F Lancet, i, 202, 1956

Makowski E L, Prem K A and Kaiser J H Science, 123, 542, 1956

Marberger E, Boccabella R A and Nelson W O Proc Soc Exptl Biol Med, 89, 488, 1955

Moore K L and Barr M L Acta Anatomica, 21, 197, 1954

Moore K L and Barr M L Lancet, ii, 57, 1955

Sachs L, Serr D M and Danon M Science, 123, 548, 1956

Sachs L, Serr D M and Danon M Brit Med Jour, ii, 795, 1956

THIRD DEGREE UTEROVAGINAL PROLAPSE WITH COMPLETE PERINEAL TEAR

(A Case Report)

by

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Uterovaginal prolapse with complete perineal tear occurs only infrequently Authorities like Wilfred Shaw believe that it is almost unknown He explains that with complete perineal tear, the patient exercises her levator ani muscles continuously and to an extreme degree in order to obtain sphincteric control over the rectum and this way tones up not only the pelvic floor but also the ligamentary supports in the pelvis Hence, the prolapse in these cases does not occur Same observation has been made by Jeffcoate and Masani

Supports of Uterovaginal Canal

Main supports of uterovaginal canal are the levator ani muscles, the so-called ligaments which are bands of fibro-muscular tissue and the endopelvic fascia which surrounds the pelvic organs Levator ani consists of three parts, ilio coccygeus, ischio-coccygeus and pubo coccygeus Pubo-coccygeus is the most important and this can be divided into pubo coccygeus proper, pubo-rectalis and pubo-vaginalis Pubo-coccygeus is inserted into the coccyx and the ano-coccygeal raphe The pubo-rectalis forms a sling at the ano-[illegible] junction Its fibres fuse with [illegible]es of the external sphincter on all sides of the rectum and thus act as voluntary control of defaecation. The pubo-vaginalis fibres decussate between vagina and rectum and take part in formation of perineal body along with other perineal muscles and the uro-genital diaphragm It is generally believed that damage to the perineal body is one of the major factors in the causation of prolapse and this acts by widening the hiatus urogenitalis and makes the herniation easy It is true that majority of cases of prolapse occur in multiparae conforming to the above belief, and yet it is a well-known fact that only rarely prolapse occurs in cases of complete perineal tear A case with this combination was seen and treated by us and is reported here

Case Report

Patient J D R No 1346 age 60 years P 9 + 0 was admitted to the All India In

the interval of 5 and 7 years. None of them ever menstruated throughout their life time.

Treatment

She was treated with dietetic restriction, amphetamine sulphate, chlorothiazide and thyroid. Within three months she reduced 30 lbs in weight and started feeling more fit to do her usual household work. Her breast trouble never recurred during the period under observation.

She was then kept on steroid therapy along with thyroid and antiobesity regime for six months. At the end of this period when she was examined about a fortnight back, she showed clinical evidence of ten weeks' pregnancy. Her A Z test was done, which showed positive result.

Comments

It is extremely rare to find a case of amenorrhoea associated with retention of fertility. This case not only shows amenorrhoea throughout her life time and pregnancy taking place at a very elderly age but also gives family history in which her two sisters never menstruated and still gave birth to several children. It suggests possibility of a genetic pathology.

Following investigations were done

Blood-Hb—11 gms per 100 mils R B Cs 4 6 millions c.mm W.B Cs 4600 per c mm, Polymorph, 51%, Lymphocyte 41% Monocytes 3%

E.S.R 63 mm (Westergreen)

Stool Nothing abnormal detected

Urine Reaction acid Sp gravity 1010 Albumin nil Sugar nil Bile salts nil Bile pigments nil Microscopic exam Pus cells not found

Serum proteins, 5.28 gms/100 mils Albumin 2 8 gms/100 mils Globulin 2 4 gms./100 mils

Blood urea 30 mgms/100 mils Fasting blood sugar 75 mgms/100 mils Chest X ray no intra thoracic lesion seen

Pre-operatively the patient was given high protein diet multi-vitamins iron and bed rest In a few days the cervical trophic ulcer healed and her general condition improved She was operated on 10th September 1959 A modified Fothergill s operation and repair of the complete perineal tear was carried out

Procedure

The bladder was dissected off the cervix as in Fothergill s technique The pouch of Douglas was opened the enterocele sac was excised and closed with a purse string suture and the uterosacral ligaments were approximated Cervix was amputated and reconstructed and the vaginal mucosa repaired as usual Repair of the complete perineal tear was then carried out as described by Bonney Post-operatively she was given strepto penicillin half gram streptomycin and 4 lacs procaine penicillin daily and was given low residue diet She developed allergic rash on the fifth post operative day so the strepto penicillin was discontinued As low grade pyrexia persisted she was put on achromycin 250 mgms. 4 hourly which was given for five days She was originally put on prophylactic strepto penicillin post-operatively in view of the fact that [illegible] erito neal cavity wa [illegible] r of the e[illegible] com- plete [illegible]

operative day and this gradually subside[illegible] in a week s time Stool examination wa[illegible] negative

Post operative result was good and he[illegible] sphincter tone was good

She was seen three months after th[illegible] operation and was doing well The con trol of defaecation was satisfactory She no longer had urgency of micturition

Comments

It is interesting to note that patient had prolapse for 43 years which started at the same time as the complete perineal tear, though it was aggravated by menopause Urinary symptoms were present for nearly 40 years It is wonderful and yet typical of patients like her who continue with their disabilities for so long without seeking medical aid, and come only when the trouble is progressively increasing

In view of her age and low general health a minimum operative procedure, compatible with good function, was desirable, hence modified Fothergill with repair of enterocele and repair of complete perineal tear was performed In spite of the diarrhoea, the ultimate result was good

This case is recorded in view of the scarcity of such case records in literature

Summary

1 A rare case of third degree prolapse with complete perineal tear is reported

2 The treatment given is described

3 The literature is reviewed and impressions of some authorities on [illegible]

stitute of Medical Sciences Hospital on 29th August, 1959, with the history of a mass coming down per vaginam for last 43 years, since her first child-birth It was small at first and used to disappear on lying down but for the last 7-8 years it was constantly out She was also suffering from urgency of micturition for 40 years, and at times, she would pass urine on her way to the toilet She also had occasional pain and burning during micturition For the past 2 to 3 years she was having slight blood-stained discharge off and on after local trauma to the prolapsed mass

On leading questions she gave a history of difficulty in controlling defaecation since her first child-birth, and used to have incontinence whenever she had diarrhoea

She had nine full-term normal deliveries Three children were alive and well and six died of various ailments in childhood Her youngest child was 22 years old She had menopause 22 years back—the periods did not return after her last delivery

On Examination

She was short statured, rather obese and slightly pale Her blood pressure was 120/80 Temperature was normal Cardiovascular and respiratory systems were normal

Examination of genitalia revealed a complete perineal tear with a third degree prolapse, a large cystocele and an enterocele There was a small trophic ulcer about 1 cm in diameter on the anterior lip of the cervix and the vaginal mucosa was healthy On bimanual examination the uterus was found to be retroverted and small No masses were felt in the fornices (Figs 1, 2)



Fig 1

Complete perineal tear Prolapse has been reduced to show the tear Prolapsed rectal mucosa can be seen



Fig 2

Third degree prolapse of the cervix Complete perineal tear is partly covered Part of prolapsed rectal mucosa can be seen

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"OVULATION DURING LACTATION' AS DETERMINED BY ENDOMETRIAL BIOPSY

by

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It is a common observation that during amenorrhoea of lactation, conception occurs with relative infrequency This fact has led to the belief that during lactation amenorrhoea, as in other types of amenorrhoea, the ovulatory phenomenon is held in abeyance The fact that some women do conceive during this period has brought up the question of the degree of suppression of ovarian activity Lass, Smelser and Kuzrok (1938) for the first time showed that the large proportion of menstrual cycles that occur during lactation are of anovulatory type The histologic method alone was employed by them They concluded that uterine bleeding may or may not be preceded by ovulation Accordingly sterility during lactation is relative and not absolute They found that occurrence of an ovular cycle during one month does not predispose to similar cycle the following month They found it difficult to understand why one patient shows anovular cycles throughout, whereas another has fertile periods

Rutherford and Mazer (1942) found evidence of secretory activity in one lactating woman at 5 weeks, in another at 12 weeks postpartum They concluded that on an average,

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cal Officer for 6 months In 1936, she was appointed an Hon Surgeon which post she held till 1941, when, after reorganisation of the posts, she was appointed Hon Obstetrician and Gynaecologist In 1947, she succeeded Dr Jhirad as Medical Officer of the Hospital—Sh... an able admin... Desai M... and the... which... proved... ing Dr... ed dur... was th...

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for many years At the recent Golden Jubilee Celebrations of the A M W I in Bombay, she was one of the active members of the Executive Committee Recently, she took up the treasureship of the Association In her death, the A M W I, loses a very use...

memory by upholding the fine traditions set by her The daughter is an Arts graduate and has inherited many of the fine qualities of her mother

Mrs Wadia had such fine qualities that she got into other people's heart and remained there for ever By her charming personality, spirit of gaiety and keen sense of humour, she made many friends and among them were many of her teachers who held her in high esteem Those of us who were privileged to know her intimately regret her passing away but she will be ever in our hearts through the many happy memories s... left with us

She passed away on 7th... 1960, at 5-00 a m when all th... papers had already left the pr... therefore no announcement... funeral the same afternoon c... given In spite of this, m... women attended the funeral ... hundreds, indeed, a glowing... tribute to one who had given s... of herself, professionally and i... other ways

May her soul rest in peace

K...



B November 1901 D August 1960

His grandfather as well as his... were eminent lawyers of the... Bar It was the desire of his... that their eldest son should ... a Civilian but Providence m... his fate otherwise After pass... B Sc examination with Hono... Physics from the Dacca Colle... was admitted into the Medica... lege, Calcutta, from where he ... ed his M B degree in 1928, ... brilliant career at his back ... a Goodeve scholar for his prof... in Obstetrics & Gynaecology

He was recruited into the ... Medical Service in 1930 and ... ed in various capacities in ... Institutions He went to the ... Kingdom in 1937 and obtain... M R C O G and F R C S E wi... dit Subsequently, in 1948, he b... a Fellow of the Royal Colle... Obstetricians and Gynaeco...

patient It is important to be gentle in doing a biopsy and to employ the usual aseptic and antiseptic procedures The criterion of Noyes, Hertig and Rock were used to date the endometrial specimens

Results

Analysis of Biopsies in Amenorrhoeic Group

Total no of biopsies	120	From lactating cases	98		
		From nonlactating cases	22	Full term	10
				Premature	5
				Post-abortum	7

Out of a total of 197 endometrial biopsies, 77 were obtained from menstruating women, 120 were obtained from women who had amenorrhoea

Biopsies from Lactating Amenorrhoeic Cases

The biopsies during amenorrhoea of lactation show that the proportion of biopsies showing inactive endometrium increases with the duration of amenorrhoea It was also observed that it is often impossible to obtain any endometrial tissue if the period of amenorrhoea has been prolonged

From the above table it is seen that in about a third (31 6%) of these specimens there is no sign of growth or activity of the endometrium The endometrium corresponding to late and mid-proliferative phase was found only if the biopsy was taken within 3 months after delivery

Biopsies from Non-lactating Amenorrhoeic Group

Biopsies after full-term delivery

Out of 10 biopsies taken during amenorrhoea after full-term delivery in non-lactating cases, 8 were taken in 3 months post-partum and 2 in the 4th month post-partum

Study of histology of these biopsies showed

Early proliferative phase 8 biopsies

TABLE I

Biopsies from 89 Lactating Amenorrhoeic Cases

Months post-partum	Proliferative			Inactive	Scanty or no tissue	Total No of biopsies
	Late	Mid	Early			
1-3	2	14	43	5	3 (4 5%)	67
4 6	—	—	7	5	6 (33.3%)	18
7-9	—	—	—	2	4 (66 6%)	6
10-12	—	—	1	—	—	1
More than 12	—	—	—	—	6 (100%)	6
Total	2	14	51	12	19	98
		16.3%	52%	31.6%		

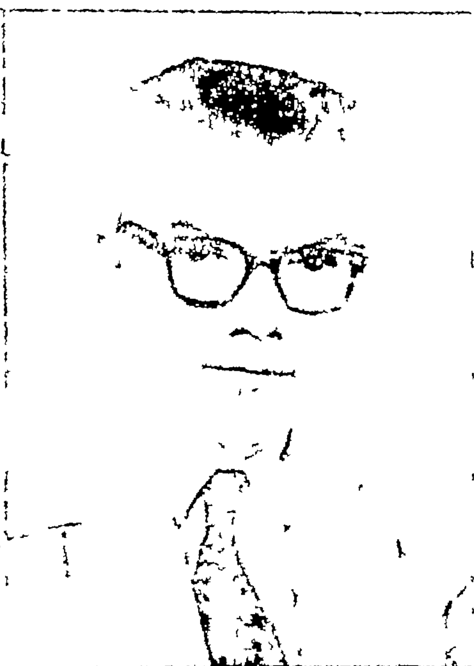
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May her soul rest in peace!

K M M



B November 1901 D August 1960

Dr Sudhir Chandra Bose was born in November 1901 at the house of his maternal grandfather at Sylhet He was the eldest son of the well-known Bose family of Kol[illegible]
[illegible] District of Dac[illegible]

His grandfather as well as his father were eminent lawyers of the Dacca Bar It was the desire of his parents that their eldest son should become a Civilian but Providence moulded his fate otherwise After passing his B Sc examination with Honours in Physics from the Dacca College, he was admitted into the Medical College, Calcutta, from where he obtained his M B degree in 1928, with a brilliant career at his back He was a Goodeve scholar for his proficiency in Obstetrics & Gynaecology

He was recruited into the Bengal Medical Service in 1930 and worked in various capacities in several Institutions He went to the United Kingdom in 1937 and obtained his M R C O G and F R C S E with credit Subsequently, in 1948, he became a Fellow of the Royal College of Obstetricians and Gynaecologists, England

On his return from England in September 1938, Dr Bose was first posted to the Calcutta Medical College Hospitals and later worked a[illegible]
[illegible]

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More than 12	—	—	—	—	6 (100%)	6
Total	2	14	51	12	19	98
		16.3%	52%	31.6%		

postpartum patient is sterile for 6 weeks Topkins (1943) in a study of 145 biopsies of 29 lactating amenorrhoeic women found progestational endometrium in 6% of specimens Elsner (1948) found first postpartum period ovular in 58% of the first menstruation in 60 postpartum women, only 4 were not lactating In a study of 34 patients Grunberger (1948) found first bleeding to be ovular in one third of the cases, second bleeding ovular as a rule, and third always ovular Both these workers took progestational changes in the endometrium as evidence of ovulation Udesky (1950) studied 36 lactating women who had their first postpartum menstruation while still nursing Sixteen had biopsies done one to ten days before the onset of bleeding and 20 were biopsied 20 to 40 days following the onset of bleeding Three out of first 16 premenstrual and 2 out of 20 postmenstrual biopsies were luteal i e in 14% evidence of ovulation was found

Davis (1946), by using basal body temperature record as evidence of ovulation in 500 patients, concluded that in the postpartum period there is little variation in the temperature until ovulation has been resumed, basal temperature curves then suggest that the first bleeding is rarely ovular but the second bleeding is associated with ovulation in approximately half the patients Lyon and Stamm (1946) also studied basal body temperature taken per rectum in 50 unselected puerperal women for 6 months They concluded that those who menstruated during lactation, frequently also ovulated and that nonmenstruating lactating women very rarely ovulate

An extensive study on ovulation after pregnancy was done by Sharman in 1951 He studied 626 endometrial biopsies in 285 normal postpartum women, 185 from 82 cases proved to be premenstrual, out of these only 14 were lactating In another group of 100 cases, endometrial biopsies were taken at 42 and 49 days postpartum Specimens taken within 10 days of the succeeding flow were regarded as premenstrual He observed that during the postpartum period, irrespective of lactation, no case was found ovular during the first 6 weeks postpartum During the next 6 weeks 56% of the first biopsies were ovular, during the following 12 weeks, i e 13-24 weeks postpartum, 86% of first biopsies were ovular The first ovular premenstrual specimen from a lactating woman was detected at 13 weeks

Method of Study

A study was planned at the Lady Hardinge Medical College and Hospital, New Delhi, with the object of determining the frequency of ovulation during lactation There is no reliable practical test widely accepted as a true criterion of ovulation The views on the validity of the methods employed to determine ovulation differ greatly However, it is accepted now that the most satisfactory proof of ovulation is the presence of a secretory endometrium late in the cycle The histology of endometrium was the only method of study for the presumptive evidence of ovulation employed in the investigation The technique of obtaining endometrial biopsy specimen is simple, safe and can be accomplished with little discomfort to the

Early proliferative phase	3
Inactive endometrium	2
Retained products of conception	1

From Table II it is observed that ovular cycles occur more frequently in nonlactating cases than in the lactating, the difference is more marked in biopsies after abortion The frequency with which first menstruation is preceded by ovulation in lactating and nonlactating cases after full-term delivery or after abortion is compared in Table III The endometrial biopsies reported here were taken either on first day of menstrual flow or were known to have been succeeded by menstruation within 10 days

TABLE III
Biopsies of First Menstrual Cycle

Duration of gestation	Ovular	Anovular
6-12 weeks	4 (100%)	0
13 27 "	2 (50%)	2 (50 0%)
28-37 "	5 (45 4%)	6 (54.6%)
37-40 " (nonlactating)	4 (57 1%)	3 (43.0%)
37-40 (lactating)	2 (16.6%)	10 (83 4%)
Total	17 (44 7%)	21 (55.3%)

From this table it is clear that first menstrual cycle after an abortion is more likely to be ovular than that after later termination of pregnancy The difference between lactating and nonlactating is striking Extensive studies by other workers also suggest high frequency of ovulation in the first menstrual cycle after abortion Elsner found first menstruation ovular in 80% of the 60 cases Grunberger found first menstruation ovular in 67% of 31 cases Sharman found 72% of 42 first postabortum menstrual cycles ovular

The first ovular biopsies were obtained as early as 28 days after abortion in 3 cases By eleventh week one case was found pregnant without any preceding menstruation Thus it seems that the shorter the duration of pregnancy the earlier is the return of menstruation as well as ovulation. Rutherford and Mazer concluded that ovulation occurs within first two to three weeks after abortion.

TABLE IV
Analysis of First Menstrual Cycle according to Weeks Postpartum (Full term Delivery)

Weeks postpartum	Lactating		Nonlactating	
	Ovular	Anovular	Ovular	Anovular
5	—	1	—	—
6	1	2	2	1
7	—	—	1	1
8	—	1	1	—
9	1	1	—	—
11	—	—	—	1
12	—	2	—	—
19	—	1	—	—
37	—	1	—	—
1 year	—	1	—	—
Total	2	10	4	3

Late proliferative phase 1 biopsy
Endometrial hyperplasia 1 biopsy

The one in late proliferative phase was followed 10 days later by menstruation Repeat biopsy in this case on the first day of menstruation showed proliferative phase The biopsy showing endometrial hyperplasia was followed by menstruation 20 days later and the same pattern was seen in the biopsy taken on first day of menstruation

Biopsies after Premature Delivery (28-36 weeks)

The total of 5 biopsies in cases of amenorrhoea after premature delivery were taken within 16 weeks post-partum These biopsies showed

Early proliferative phase	2
Mid-proliferative phase	2
Scanty tissue	1

The two cases showing early proliferative had biopsies taken in the 5th and 15th week postpartum respectively The first case continued to bleed for 12 days after the biopsy and the repeat biopsy after 10 days showed scanty tissue The second case with early proliferative endometrium had menstruation 10 days later but no biopsy could be taken

Biopsies after Abortions

Out of 6 endometrial biopsies, five were taken within 4 weeks after abortion, two of these 5 showed inactive endometrium The one remaining biopsy, taken 6 weeks after abortion of 24 weeks' gestation, showed early proliferative endometrium and was followed 11 days later by menstrual flow Histology of biopsies after abortion showed

Data on Biopsies on Menstruating Group

Total number of biopsies 77	From lactating cases	34	During lactation	30
			After weaning	4
	From nonlactating cases	43	After full-term delivery	12
			After premature delivery	17
			After abortion	14

TABLE II

Ovulation in Menstruating Group, Lactating and Non-lactating Cases

	Lactating		Nonlactating		
	During lactation	After weaning	Full-term	Pre-mature	Abortion
No of cases	26	3	11	12	12
Anovular	17	1	4	8	2
Ovular	13	3	8	9	11
Per cent ovular	43 3	75 0	66 6	52.9	84 6

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	During lactation	After weaning	Full-term	Pre-mature	Abortion
No of cases	26	3	11	12	12
Anovular	17	1	4	8	2
Ovular	13	3	8	9	11
Per cent ovular	43 3	75 0	66 6	52.9	84 6

Summary

Out of total 197 biopsies, 120 were taken during amenorrhoea Of these, 98 were taken during lactational amenorrhoea in 89 cases Out of 77 biopsies from menstruating group, 30 were obtained from 26 lactating mothers Rest were from the cases who were nonlactating, after full-term or premature deliveries or abortions

1 16% of the first cycles in lactating mothers were ovular (total 12 biopsies), 57% of first cycles in nonlactating were ovular It suggests that lactation does inhibit ovulation in addition to postponement of menstruation Very few biopsies were available for the subsequent cycles to conclude on the rate of return of ovulation. In lactating women, 50% of the second cycles and 83% of the third cycles were ovular

2 In a fully lactating mother the earliest ovular biopsy was detected in 9 weeks postpartum In one partially lactating and three nonlactating cases, ovular biopsies were obtained on 41 days postpartum

3 Endometrium tends to be atrophic as amenorrhoea is prolonged, obviously this atrophy is reversible

References

1 Davis M. E J Am Med. Ass, 130, 929, 1946
2 Desclin L. and Gregoire C Compt. Rend. Soc De Biol, 126 250, 1937
3 Elsner P Wien Klin Wchsner, 60, 433, 1948.
4 Griffith L. S and McBride W P L. J Michigan M. Soc, 38, 1064, 1939
5 Grunberger V Wien Klin Wchsner, 60, 498, 1948
6 Guttmacher A. F Fert & Steril 2, 371, 1952
7 Hamblen E. C Endocrin of Women, 1st edition, C C Thomas, 1949
8 Lass P M., Smelser J and Kuzrck R. Endocrin, 23, 43, 1938
9 Lyon R A. and Stamm M J Calif Med., 65, 9, 1946
10 Mirchandani J J Thesis for M.D, Delhi University, 1959
11 Noyes R W Hertig A T and Rock J Fertil. & Steril, 1, 1, 1950
12 Rutherford R. N and Mezer J J Am. Med Ass. 19, 124, 1942
13 Sharman A. Fert & Steril., 2, 371, 1951
14 Topkins P Am J Obst & Gyn., 45, 48, 1943
15 Udesky I C Am J Obst. & Gyn, 59 842, 1950

The first ovular menstruation occurred as early as 6 weeks postpartum in one lactating case and two nonlactating cases

Ovulation during First Three Cycles in Lactating Mothers

Biopsies reported here were taken either on first day of menstruation or were known to have been succeeded by menstrual flow within 10 days

From Lactating Mothers

Out of 30 biopsies from menstruating cases obtained during lactation, 28 biopsies from 24 cases were taken during the first three cycles

TABLE V

Ovulation in Lactating Mothers

Number of the cycle	Ovular	Anovular	Total
1st	2 (16 6%)	10 (83 4%)	12
2nd	5 (50 0%)	5 (50 0%)	10
3rd	5 (83 0%)	1 (17 0%)	6
Total	12 (42 8%)	16 (57 2%)	28

TABLE VI

Ovulation during First Four Cycles in Non-lactating Cases

Number of the cycle	Ovular	Anovular	Total
Full-term delivery (37-40 weeks)			
1st	4 (57 1%)	3 (42 9%)	7
2nd	1 (50 0%)	1 (50 0%)	2
3rd	1 (100 0%)	0	1
4th	2 (100 0%)	0	2
Total	8 (66 6%)	4 (33.3%)	12
After premature delivery (28-36 weeks)			
1st	*5 (45.5%)	6 (54 5%)	11
2nd	3 (75 0%)	1 (25 0%)	4
3rd	1 (100 0%)	0	1
4th	0	1 (100 0%)	1
Total	9 (52.9%)	8 (47 1%)	17
After abortion (6-27 weeks)			
1st	6 (75 0%)	2 (25 0%)	8
2nd	2 (100 0%)	0	2
3rd	3 (100 0%)	0	3

TABLE I
(De Allende and Orias)

	Cytology curve	Ovarian activity
1	Atrophic (with amenorrhoea)	Totally absent
2	Hypotrophic cornification curve without fluctuations hypotrophic cornification curve with fluctuations	Markedly insufficient incapable of causing menstruation or ovulation, according to degree
3	Hypotrophic acyclic and hypotrophic cyclic	Sufficient to set up menstrual cycles but without ovulation according to degree
4	Dystrophic with cornification presistently high during second half of the cycle	Dysfunction persistence of mature follicle or its transformation into an active follicular cyst with persistence of menstruation
5	Eutrophic curve with luteal phase	Completely normal with ovulation.

a trophic vaginal state lower than that observed in cases with ovulatory cycles This indicates that insufficient ovarian activity is not merely a reduced capacity to produce ova, but that of the secretion of estrogenic activity, when the latter is absent, cornified cells disappear and, as in atrophic curve, appearance and proportions of deep or basal cells indicate the degree of atrophy of the vaginal epithelium

Now turning to our country, Professor Wahi and Mehta published, in 1952, their study of 30 selected sterile women with the aid of vaginal cytology The ovulatory cycles in their cases fitted in with the descriptions provided by the western workers They too have described three types of curves, I, II III in anovulatory women independently Their type I and type II cycle cornification curves resemble the anovulatory cycle with hypotrophic acyclic curve, and the anovulatory cycle with dystrophic curves described by DeAllende and Orias respectively Their type III anovulatory curve which was very similar to the ovulatory curve as far as pattern of cornification was concerned, however, did not show evidence of desquamation, after the estrogen peak, though decline in cornification was evident They suggested that such smears possibly represented only an occasional anovulatory cycle

The most important picture that they regarded as diagnostic of ovulation was (i) desquamation and (ii) a decline in the number of cornified cells following a peak of estrogenic

"ENDOMETRIAL BIOPSY AND VAGINAL CYTOLOGY AS DIAGNOSTIC AIDS"

detection of ovulation in 88 cases Endometrial biopsy showed that 29 cases, i e 34%, had anovulatory cycles Vaginal smear did not show clear cut difference in both ovulating and the non-ovulating groups during the first half of the cycle but the difference was marked in the second half Progestational phase, when present, was seen from 14th to 26th day in women with regular cycles of 28-30 days Besides, cases with these reports had secretory endometrium and presence of urinary pregnanediol They, therefore, suggested the possibility of detection of ovulation by taking a single smear on 24th to 26th days of the cycle in women with 28 to 30 days' cycle Anovulatory cycles once again differed in the absence of curling and folding of cells, i e desquamation of cells, and their grouping together These smears looked dirty and occasionally basal cells were present throughout the cycle In all these endometrium was in the proliferative phase and urinary pregnanediol was absent throughout the cycle

Hannah Peters, in 1957, quoted a paper read by Rakoff at the International Symposium on Exfoliative Cytology, 1957, held at Brussels, on "Hormonal Evaluation through Cytologic Interpretation" She felt that though estrogen activity in the body could be quantitatively estimated by cytology, the progesterone effect was characterised by much less effect on proliferation It caused differentiation and increased desquamation of superficial layer of the vaginal epithelium

Watchel, from London, at the same symposium felt that four types of curves were important, viz the ovulatory curve and the three anovulatory curves

Cheema, also in 1957, published a study of 103 sterility patients by vaginal smear 17 5% of these patients showed moderate ovarian failure, with presence of outer basal cells in their smear He collected three smears in a cycle, one in each of the proliferative, ovulatory and secretory phases of a cycle, and an endometrial biopsy after the third smear His typing of cycles by smear gave an error index of 18 7% He found no error in typing smears showing outer basal cells, as anovulatory cycles By taking vaginal smears, the incidence of taking endometrial biopsies could have been reduced by 26 2% In cases of sterility with amenorrhoea, vaginal smears were very informative as patients could be classified for rational treatment with hormones

Professor Malkani and Sikand from Delhi, in August, 1958, published a study of co-relationship between vaginal cytology and endometrial histology in 29 cases of amenorrhoea using Shorr's trichrome technique and found cytology as the method of choice for studying ovarian function In her series, figures for tuberculous endometritis were 34 5%

Objects

It was decided to find out for ourselves,

(1) Whether detection of ovulation by vaginal cytological method was as reliable as that by endometrial biopsy

(2) Whether the two agreed or differed in the same patient when

activity, when fully cornified cells predominated They observed that there was satisfactory correlation between the cytology and endometrial biopsy An interesting finding they reported was that their type II anovulatory smear fitted in with the pubertal smear of Bonime They suggested therefore that at least some women who were sterile belonged to a lower ovarian age and were therefore not fully developed sexually

P N Shah studied 69 patients of sterility, amenorrhoea and uterine bleeding with the aid of vaginal cytology and endometrial biopsy, out of which 23 were cases of sterility, results in whom are summarised in Table II It will be seen that there was satisfactory correlation between the vaginal smears and the endometrial biopsy He agrees with Wahi et al that absence of (i) desquamation and (ii) the decline of cornification is indicative of ovarian failure, specially when associated with immature cells from the deeper layers The smear reflected every grade of ovarian activity from the abnormally high to that of total insufficiency He noted that repeated smears from patients with amenorrhoea treated with progesterone led to characteristic smears of the luteal phase, but endometrium remained in the proliferative phase He reported 4 cases of tuberculous endometritis out of which one was in a patient of sterility Smears alone could not exclude, even on careful study, this type of organic lesions Tuberculosis was discovered only by endometrial biopsy

TABLE II
(*P N Shah*)

Menstruation	Vaginal smear	Endometrial biopsy
1 Normal flow and normal interval	11/12 progestational 10/12 hypotrophic	11/12 secretory 1/12 proliferative
2 Normal flow and longer interval	½ *hypotrophic with* marked cytolysis ½ hypotrophic	½ *early* secretory ½ proliferative
3 Scanty flow and normal interval	4/5 progestational high cornification, mostly due to infection	4/5 secretory 1/5 not taken
4 Scanty flow and short interval	Hypotrophic with marked cytolysis	Early secretory
5 Amenorrhoea	½ progestational ½ hypotrophic	½ late secretory ½ proliferative
6 Metrorrhagia	Progestational	Secretory

Wahi et al, in 1957, have published data on comparative study of vaginal smear, endometrial biopsy and urinary level of pregnanediol for

sies were always carried out as near the next expected period as possible, and always in the last week of the menstrual cycle Women with marked irregularity were asked to report for biopsy immediately or within 24 hours of the appearance of the menstrual flow Nearly half showed absence of ovulation in this group The histological examination of the endometrium included noting of (i) gland mitoses, (ii) subnuclear vacuoles, (iii) stromal mitoses, (iv) pseudostratification of nuclei, (v) leucocytic infiltration, (vi) evidence of secretion, (vii) oedematous stroma and (viii) evidence, if any, of tuberculosis No case of tuberculous endometritis was encountered in these 50 cases, and in none was there any history or clinical findings suggestive of tuberculosis In all cases cytology-smear and the biopsy material were interpreted independently to avoid any prejudice acting in the interpretation of either material as a result of the report of the other Results are tabulated in Table IV

In 8 cases no opinion on cytology could be formed and in 4 no opinion on biopsy material could be expressed The cause of biopsy failures on analysis was "very scanty or no endometrial tissue seen" in all the four cases Several serial and deeper sections of these four biopsies were taken and these revealed again scanty tissue with very disorganised endometrial pattern and so it was not possible to opine Thus cytological failures were double those of biopsy failures in this type of study, but in all 4 cases where biopsy failed, the cytology showed that these patients had markedly decreased estrogen levels (one with deep cells), two had anovulatory cycles and two showed very weak progesterone action. Three of them had amenorrhoea It might be that marked hormonal deficiency might make recognition of endometrial pattern difficult Malkani has pointed out similar difficulty of recognition in atrophic endometrial biopsies in her cases of amenorrhoea

If 4 cases of biopsy failure and 8 cases of cytology failure are excluded, there remain 38 in whom both the data are available The results in these cases are tabulated in Table V

Wahi et al. had made an interesting observation, as a result of their extensive study, by suggesting that ovulation could be detected by a

TABLE IV

Endometrial biopsy done	Opinion on biopsy not possible	Opinion on cytology not possible	Biopsy agreed with cytology	Biopsy did not agree with cytology
50	4	8	34	4

TABLE V

Total cases	Cytology		Biopsy agreed with cytology	Biopsy did not agree with cytology
	Ovulatory	Anovulatory		
38	24	14	34	4

carried out simultaneously at the same time, and,

(3) Whether simple and painless method of cytology could replace the operative procedure of endometrial biopsy

The vaginal smears were collected, fixed in ether-alcohol fixative and stained by Shorr's full trichrome technique The endometrial biopsy was collected by dilation and curettage fixed in Bouin's fluid and the paraffin embedded sections were stained by hematoxylin and eosin

Selection of Cases for Study

The problem whether a woman is ovulating or not is the most important one in cases of sterility Therefore an attempt was made to select those cases in whom no other cause for sterility could be detected, in them or in their husbands, as far as possible

Cases of sterility, attending the out-patient department, were selected and smears varying from 1 to 12 from each case were collected for scrutiny To make the method most acceptable to the patient and the clinician, the smears were collected only when the patient came to see the clinician which was roughly once a week at our hospital Each patient was subjected to a thorough general and pelvic examination and all cases with inflammations, tumours, etc of the genital organs were excluded The findings of the gynecologist treating her were accepted in this respect Each case was thoroughly investigated as far as possible Rubin's insufflation test to eliminate tubal block and endometrial biopsies were taken in as many cases as possible and, similarly, husbands were requested to freshly pass semen in the hospital and each specimen was examined for the volume, viscosity, motility, sperm count, and their morphology of cells Each patient of sterility studied was clearly instructed to avoid vaginal douches, hormonal or intervaginal medication and *coitus* Cases *of absolute* sterility in the female, e g absence of uterus, were also excluded, and so were the cases of physiological amenorrhoea Thus an attempt was *made to* (i) *arrive as carefully as* possible at the cause of sterility, (ii) pay particular attention to the study of *endocrine factor* in those patients in whom no other discernible cause *of sterility could be detected*, and (iii) ascertain by cytology whether these women had normal ovulation and correlate these results with those of endometrial biopsy

Results and Discussion

In the present series, biopsy and its correlation with cytology were attempted in 50 cases The results of the endometrial biopsies are tabulated in Table III Endometrial biop-

TABLE III

Endometrial biopsy with complete curettage of endometrium	Proliferative phase	Secretory phase	Scanty or no endometrial tissue seen
50	21	25	4

tional, as clumping of cells was not marked and it was a thin smear Therefore independent cytological opinion was 'No definite evidence of progesterone action" While the endometrium in this case showed majority of the glands of the proliferative cork-screw shape, lined by tall columnar cells with basal nuclei, the stroma was highly cellular The mitotic activity was prominent A cursory look would have suggested advanced proliferative phase But some glands did show appearance of subnuclear vacuolation, and nuclei had moved away from the base Therefore the independent biopsy report was "presecretory phase, with dissociation between the glands and the stroma" Thus the two reports disagreed

On reviewing and correlating both these reports, it appears that this was an ovulatory cycle with weak progesterone activity, a case in which both the cytological and the biopsy pictures were not easy to interpret individually This was the case of disagreement in the group studied according to the suggestion of Wahi et al

It is remarkable to note that in 4 cases where biopsy failed, cytology supplied all the necessary information while in 8 cases where cytology failed, biopsy informed on ovulatory function Thus, if both investigations were applied together, success at arriving at a correct diagnosis rose to 100% If only cytology was applied, some proliferative phases would be typed as secretory Another well known disadvantage of cytology if done alone would be cases of inflammation, e g tuberculous endometritis which would be entirely missed unless an endometrial biopsy is resorted to It therefore becomes clear that one cannot replace the other, while both together, the cytology and the biopsy, achieve the ideal, the cytology supplying very useful and reliable information on the nature and degree of estrogen activity and the latter confirming the findings of the former specially about the progesterone activity and ovulation

Summary

The results of vaginal cytology and endometrial biopsy in 50 cases of sterility have been presented

An attempt has been made to correlate these findings which were arrived at independently without the results of one prejudicing the interpretation of the other

The results indicate the usefulness of the cytological technique in the study of endocrine dysfunction in the female

While it appears to be the method of choice in such a study, it cannot possibly replace the older method of endometrial biopsy Nevertheless, when used as an adjunct, the results achieved are ideal

References

1 Bonime R. G Am J Obst. and Gyn , 60, 1306-14, 1950

2 Cheema T S J Obst and Gyn Ind 4 296-306 1958

3 De Allende I L C and Orias O Cytology of Human Vagina H K Lewis and Co London, 1950

4 Dugld Baird Combined Text Book of Obstetrics and Gyneco-

single smear if the smears were collected in well advanced luteal phase and examined for progesterone activity, e g on 24th-26th day in a 28-30 days cycle, because the difference between the smears of the ovulatory and the anovulatory cycles was well marked during this period

It was decided to work out this suggestion and determine its merit 26 cases were subjected to this type of study and single smear was collected always within 24 hours of the endometrial biopsy being taken In nearly all the cases, in fact, smear was collected actually just as the patient was being prepared for the endometrial curettage and before the vaginal douche was given All other principles of the study were the same as before The results can be seen in Table VI

TABLE VI

Total cases	Cytology failures	Biopsy failures	Cytology agreed with biopsy	Cytology did not agree with biopsy	Agreement percentage where both the data were available
26	3	3	19	1	19/20 i e 95%

The results compare favourably with those of Wahi et al

The best percentage (95%) of agreement was obtained in this group, which indicates reliability of the cytological diagnosis

The analysis of 4 cases where there was discrepancy between the two methods showed that 3 cases had progestational smears and proliferative phase biopsies Such cases indeed have been fallacy of the cytological method Zondek, Toaff and Rosin, in an investigation in cases of amenorrhoea, reported typical response to hormones in the vaginal smear, but no changes in the uterine mucosa as a result of estrogen and progesterone (in certain doses) administration, and concluded that the vaginal mucosa was much more sensitive to the sexual hormones than the endometrium Smaller doses can stimulate growth rather in the vaginal than in the uterine epithelium These 3 cases too point to similar conclusions It was quite possible that the low amounts of progesterone present was sufficient to cause changes in the vaginal epithelium, but insufficient to do so in the uterine mucosa, which had therefore lagged behind and remained in the proliferative phase One of these cases actually showed a very weak progestational smear Shah, Cheema, Peters, Israel and Purshottam, and Wahi have all reported this phenomenon In these cases unless one takes a biopsy, the cycles would be typed as ovulatory Dugal Baird has pointed out that cases of refractoriness of the endometrium are occasionally encountered, are difficult to treat, and have an unfavourable prognosis In the remaining one case, the smear was dirty with detritus, and bacteria, basophilic, and showed tendency to folding of cell margins, but it could not be termed progesta-

ADENOMYOSIS UTERI

A Critical Study with an Analysis of the Five Years Cases

by

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Introduction

It was our impression that incidence of adenomyosis is very low in our hospital We thought that we met with only an occasional case of adenomyosis The present study was undertaken to confirm or contradict our impression In our country, except for an article by Lazarus, we could not find many articles on this subject which was also responsible for our impression Purandare has analysed cases of adenomyosis some 25-30 years ago

Material and Methods

This is an analysis of cases of adenomyosis admitted in K E M Hospital, Bombay, from 1954 to 1958 (five years) It includes cases diagnosed after hysterectomies (mostly generalised type) as well as cases where uteri were conserved but only adenomyotic tissue was removed (localised type) The detailed clinical history is recorded and histological sections studied and confirmed An attempt is made to correlate various clinical signs and interpret these in the light of the present studies

Awarded Sir Kasanji Ranchhodji Prize for the best analysis of cases for the year 1959

Incidence

There were 38 cases of adenomyosis from 1954-1958 Five hundred and seventy hysterectomies were performed during the same period All uteri removed were subjected to histological examination. Adenomyosis was found in 33 cases In 5 cases of localised adenomyosis, the uterus was not removed but only the adenomyotic tissue was removed Thus the incidence of adenomyosis among all hysterectomies is 6% approximately This incidence is much lower than that quoted in western literature Crossen records the incidence among hysterectomies as 20-30%, Hunter quotes as 27 8% and Benson et al 21 4% However it is not unusual to come across low incidence even in western literature Drefuss finds the incidence as 8 1% among all uteri removed Brines et al encountered the incidence of 10 7% among all uteri removed We believe that too much reliance on the incidence cannot be placed because histological criteria for the diagnosis are not standardised A very slight invasion of myometrium by endometrial tissue may be considered as normal by one and pathological by another As there is no layer of submucosa between endome-

logy, 5th edition, E & S Livingstone, London, 1950
5 Hannah Peters Ind J Med Sci, June and July, 1957
6 Malkani P K and Sharma S J Ass Med Women Ind, 3, 71-79, 1958
7 Papanicolaou G N Atlas of Exfoliative Cytology, Harvard
8 Peters H, Israel S and Purshottam S Fertility and Sterility U S A, 9, 2, March-April, 1958
9 Shah P N Ind J Med Sci, 6, 10, 683, 1952
10 Wahi P N and Mehta U Ind J Med Sci, 6, 8, 477-88, 1952
11 Wahi P N, Kumar R and Chandra K Ind J Med Sci, 11, 2, 1957
12 Wahi P N, Kumar R and Chandra K Ind J Med Asso, 28, 12, 507, 1957
13 Zondek B, Toaff R and Rozin S J Clin Endocrin, 10, 615, 1950.

periods, prolonged periods or bleeding apart from the periods Thirty-one patients complained of menorrhagia but on detailed history only 26 had abnormal uterine bleeding Other workers have also reported high incidence of abnormal uterine bleeding, viz Spatt 53%, Novak 36%, Hunter 77% and Yates 51% The incidence of dysmenorrhoea in sterility cases was high Out of 9 cases with sterility, 6 cases had dysmenorrhoea (66%) It is difficult to evaluate whether the painful periods have any organic basis or whether it is psychological

Parity

TABLE V

	No of cases
Nullipara	3
Para I	5
Para II to IV	10
Para V and above	20

Though sterility is a fairly common association with adenomyosis, adenomyosis does not appear to be the cause of sterility We had 9 cases of sterility (25%) out of which 3 had primary sterility and 6 had secondary sterility More than half were multiparas in my series Hunter and Benson et al also believe that adenomyosis is common in multiparas

Time Interval after Last Delivery

TABLE VI

1 to 4 years	5 cases
5 to 10 years	17 cases
11 years or more	16 cases

Some workers believe that prolonged action of oestrogens uninterrupted by progesterone is responsible for the development of adenomyosis About 42% of the patients in this series had their last delivery more than 10 years ago

Symptoms

The above analysis shows that above the age of 40 years, menorrhagia is a more frequent symptom of adenomyosis Twenty out of 25 cases had menorrhagia, whereas only 6 cases out of 13 cases under the age of 40 years had menorrhagia Another fact that emerges from the above analysis is that dysmenorrhoea is a more common feature in women under the age of 40 years Nine cases out of 13 under the age of 40 had dysmenorrhoea, whereas only 6 cases out of 25 above the age of 40 years had dysmenorrhoea It is the general belief that symptoms in cases of adenomyosis are usually due to associated lesions and not due to adenomyosis per se Hunter believes that adeno-

TABLE VII

		25 cases above 40 years	13 cases under 40 years
Menorrhagia	26 cases	20 cases	6 cases
Dysmenorrhoea	15	6 "	9 "
Sterility	9	Nil	9 "
Lump in abdomen	3 "	2 "	1 "

trium and myometrium, it becomes difficult at times to know where the endometrium ends and myometrium begins We believe that the comparison of incidence will be of help only when the criteria for histological diagnosis of adenomyosis are standardised

TABLE I

Year	No of cases
1954	10
1955	6
1956	5
1957	6
1958	11
Total	38

Community

It is difficult to draw conclusions as regards incidence in various communities This is because our hospital is situated in predominantly Maharashtrian locality We would like to point to one fact that looking to the attendance of Christian patients, 6 cases out of 38 is a fairly high incidence

TABLE II

	No of cases
Maharashtrian	24
Christian	6
Sindhi	4
Gujarati	3
Muslim	1
Total	38

Age

There is general agreement that adenomyosis is more common in later years of life Cullen Westman, Jeffcoate Drefuss, Brines, Siegler etc believe that it is more common in the 5th decade of life Our series also shows higher incidence after 40 years There are 25 cases above the age of 40 years, which comes to more than 60% of the total cases

TABLE III

Age in years	No of cases
25 to 29	1
30 to 34	3
35 to 39	9
40 to 44	12
45 to 49	8
50 and above	5

The youngest patient in our series was 26 years and the oldest 55 years

There is one pitfall in judging the age incidence We must take into consideration the duration of the symptoms before the patient comes for treatment It is likely that some patients may rush in for treatment very early whereas others may delay for some years And thus, though the disease may have originated at the same time in these cases, the age incidence may be labelled differently because they came for treatment at different times Moreover, it is difficult to find out the actual onset of disease in asymptomatic cases, as some cases have come with a different complaint and the uterus removed, when adenomyosis is an incidental finding

Relation to Menstrual Cycle

TABLE IV

	No of cases
Abnormal uterine bleeding	26
Normal cycle	10
Menopausal	2
Dysmenorrhoea	15

By abnormal uterine bleeding we include all cases with excessive

Treatment

Hysterectomies	33 cases	Abdominal	— 12 cases
		Vaginal	— 21 cases
Conservative	5 cases		

The conservative treatment in five cases was as follows -

1 Left salpingo-oophorectomy with adenomyomectomy and right salpingostomy
2 *Excision of adenomyosis on* posterior wall with bilateral implantation of tubes
3 Excision of fibroid with adenomyomectomy and bilateral implantation of tubes
4 Left oophorectomy with excision of adenomyosis of the posterior wall
5 Fundectomy with implantation of tubes

There is a general agreement that ideal treatment of adenomyosis in women nearing menopause or in menopause is hysterectomy The route of operation is decided by the size of the uterus, mobility of the uterus and associated adnexal pathology In the present series 21 uteri could be removed per vaginam However, abdominal route is preferable if uterus is more than 3 months' size of pregnancy, or there is associated pelvic pathology

In younger age group during the child-bearing period and especially when the patient has come with sterility, every effort must be made to save the uterus It is advisable to preserve the menstrual and child-bearing function in young women as far as possible Of the five patients on whom conservative treatment was carried out, Cases 2, 3 and 5 came for follow-up Hystero-salpingography done recently showed that all the three patients have blocked tubes That means the patency of the tubes could not be maintained in spite of keeping polyethelene tube for 3 months None of the 3 patients seen have conceived However their symptoms are relieved

Discussion

Adenomyosis is recognised as a definite entity only for the last 50 years Rokintansky and Von Recklinhausen described this condition as early as 1882 Cullen is given the credit of establishing a sound *basis for the clinical and histological* diagnosis of adenomyosis (1908) Adenomyosis was named differently at various times, depending upon the existing concept about its origin Thus it has been named as Adenomyoma, Adenomyomatosis, Internal and External Uterine Endometriosis, Von Recklinhausen's disease, Adenometritis, Adenomyometritis These various terms are sufficient to reflect on the chaotic condition that prevailed about the origin and histology of adenomyosis There is a general agreement that this entity should be known as adenomyosis

In spite of Cullen s classical monogram on adenomyoma and his description of adenomyoma it was considered as a rare entity and even solitary cases of adenomyosis were reported (Abel Frank and Robins) Cullen was the only person to report

myosis without associated lesions also can cause symptoms Our analysis is in agreement with Hunter, because in our series associated lesions were present in only 7 cases This does not include 10 cases of prolapse because prolapse usually does not cause menorrhagia or dysmenorrhoea

Physical Signs

TABLE VIII

	No of cases
Slightly enlarged uterus	16
Moderately enlarged uterus	5
About 3 months size uterus	3
Prolapse of the uterus	10
Retroverted uterus	16
Bilateral cystic masses	4
Restricted mobility of the uterus	7

The size of the uterus was normal or less than normal in 14 cases It is not necessary to get a bulky uterus in all cases of adenomyosis Symptoms are more important in the diagnosis of adenomyosis It is worth recording that in 63% of the cases the uterus was enlarged in size

Clinical Diagnosis

TABLE IX

	No of cases
Metropathia	19
Adenomyosis	8
Prolapse uterus	7
Fibroid uterus	3
Malignancy uterus	1

As it is seen from the symptomatology that abnormal uterine bleeding is a fairly common feature, it is not surprising that metropathia was diagnosed in about 50% of the cases The clinical diagnosis of adenomyosis was entertained in about 21% of the cases in our series We had 10 cases of prolapse in our series Out of these, adenomyosis or metropathia was suspected in 5 cases because of symptoms The other five cases of prolapse had no other symptoms other than prolapse and so clinical diagnosis of prolapse was made But the histological report on these uteri removed primarily for prolapse showed adenomyosis These are the asymptomatic cases of adenomyosis

Associated Lesions

TABLE X

	No of cases
Salpingo-oophoritis	4
Fibroid uterus	3
Ovarian cyst	1
Prolapse uterus	10
Malignancy	Nil

We are surprised at the low incidence of fibroids in association with adenomyosis Only 8% in our series had fibroids of uterus Other workers have quoted a very high incidence (Crossen 60-70%, Novak 62 5%, Drefuss 40%, Benson et al 56 6% and Spatt 40%) We have no explanation for this low incidence of fibroids About 27% of the cases had prolapse In Hunter's series, 28% of cases had prolapse There was no case of associated malignancy in our series

resemble the glands found in stratum basalis of normal endometrium So the adenomyotic glands do not participate to a great extent in cyclic hormonal changes It is believed that the basal layer does not respond to progesterone stimulus but responds to oestrogens Thus the adenomyotic glands do not undergo progestational change Novak believes that occasionally the aberrant endometrium exhibits the cyclic functional responsiveness of normal endometrium but more often it is of an immature, unripe variety Novak further observes that in an occasional case, the invading endometrium shows not only the cyclic changes of menstruation but also decidual changes of pregnancy Kistner has come forward with conflicting reports when he mentions that the alleviation of symptoms by a state of pseudo-pregnancy in case of endometriosis is due to decidual transformation of the lesions of the endometriosis Decidual transformation cannot occur unless the ectopic endometrium responds to progestational stimulus

There are conflicting reports as regards changes in normally situated endometrium in cases of adenomyosis Some workers believe that endometrium shows normal picture corresponding to that period of menstrual cycle (Drefuss Hunter etc) Others believe that anovulatory endometrium is found in the majority of cases of adenomyosis (Spatt, Von Numers etc)

After finding adenomyosis in uteri removed for some other lesion with no symptoms pertaining to adenomyosis some workers have started doubting whether adenomyosis should at all be considered as pathological Meyer and Kitair found that a moderate degree of adenomyosis was almost a rule in women approaching menopause Brines and Blair consider adenomyosis as a minor physiological deviation from normal

Though there is ectopic endometrium in adenomyosis as well as in endometriosis, Brines et al believe that these are two distinct anatomical entities with different symptomatology and age incidence Adenomyosis occurs late in life or in middle life Endometriosis occurs in a younger age group The origin of ectopic endometrium is different in these two conditions Secondly, the impulse responsible for endometrial growth propensity, affects the uterine musculature as well in adenomyosis, whereas in pelvic endometriosis only endometrium is usually concerned

Radiological diagnosis has been studied by Goldberger et al According to them uterus in adenomyosis gives a peculiar irregular outline to the uterine wall in hysterosalpingography

There is a general agreement about the treatment of adenomyosis When there is a generalized type of adenomyosis where the whole uterus is involved and if the patient is nearing menopause or past that age as is usually the case in generalized lesions, the treatment of choice is hysterectomy In younger age group, with localised lesion the aim should be to preserve the uterus as was done in five of our cases Radium insertion has been given a trial and given up because in younger patients it unnecessarily destroys ovarian

myosis without associated lesions also can cause symptoms Our analysis is in agreement with Hunter, because in our series associated lesions were present in only 7 cases This does not include 10 cases of prolapse because prolapse usually does not cause menorrhagia or dysmenorrhoea

Physical Signs

TABLE VIII

	No of cases
Slightly enlarged uterus	16
Moderately enlarged uterus	5
About 3 months size uterus	3
Prolapse of the uterus	10
Retroverted uterus	16
Bilateral cystic masses	4
Restricted mobility of the uterus	7

The size of the uterus was normal or less than normal in 14 cases It is not necessary to get a bulky uterus in all cases of adenomyosis Symptoms are more important in the diagnosis of adenomyosis It is worth recording that in 63% of the cases the uterus was enlarged in size

Clinical Diagnosis

TABLE IX

	No of cases
Metropathia	19
Adenomyosis	8
Prolapse uterus	7
Fibroid uterus	3
Malignancy uterus	1

As it is seen from the symptomatology that abnormal uterine bleeding is a fairly common feature, it is not surprising that metropathia was diagnosed in about 50% of the cases The clinical diagnosis of adenomyosis was entertained in about 21% of the cases in our series We had 10 cases of prolapse in our series Out of these, adenomyosis or metropathia was suspected in 5 cases because of symptoms The other five cases of prolapse had no other symptoms other than prolapse and so clinical diagnosis of prolapse was made But the histological report on these uteri removed primarily for prolapse showed adenomyosis These are the asymptomatic cases of adenomyosis

Associated Lesions

TABLE X

	No of cases
Salpingo-oophoritis	4
Fibroid uterus	3
Ovarian cyst	1
Prolapse uterus	10
Malignancy	Nil

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10 Jeffecoate Quoted by Spatt (19)
11 Kistner R. W Am J Obst Gyn 75, 264, 1958
12 Lazarus Hilda J Obst Gyn of India, 1 161, 1950
13 Mayer and Kitair Quoted by Spatt (19)
14 Novak Emil and Delima Am J Obst. Gyn., 56, 634, 1948
15 Novak Emil Gynaecologic and Obstetric Pathology, W B Saunders Company 1953
16 Purandare N A Personal communication
17 Robins Quoted by Spatt (19) Jr South Surg A 36, 394 1923
18 Siegler S L. Am J Obst Gyn, 61, 99, 1951
19 Spatt S D Am J Obst Gyn, 52, 581, 1946
20 Von Numers Quoted by Novak (14)
21 Westman S Quoted by Spatt (19)
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Fig 1
A case of generalized adenomyosis



Fig 2
Low power view of adenomyosis

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Fig 1
A case of generalized adenomyosis



Fig 2
Low power view of adenomyosis

function and in the aged it may mask the malignancy of the genital tract

Some observations of Dr Lazarus

Lazarus has analysed 26 cases of Adenomyosis Uteri She does not mention the year of collection of these cases and so her series is not strictly comparable with our series Out of her 26 cases, 10 cases had menorrhagia and 9 cases complained of dysmenorrhoea She believes that early marriage does not preclude the incidence of adenomyosis or endometriosis Fibroids were common accompaniment of adenomyosis in her series (21 cases had fibroids) She suggests that rupture uterus, uterine inertia, post-partum haemorrhage and frequent abortions may be the result of adenomyosis

Conclusions

(1) The incidence of adenomyosis among all hysterectomies is 6%

(2) The incidence of adenomyosis is higher in women after 40 years

(3) Menorrhagia is an important symptom of adenomyosis in older age group and dysmenorrhoea is an important symptom in younger age group

(4) Sterility was found in 25% of the cases

(5) Cases of adenomyosis with sterility have higher incidence of dysmenorrhoea

(6) Adenomyosis is more common in multiparas

(7) More than 42% of cases had their last delivery before more than 10 years

(8) The uterus was of normal size in 37% of cases

(9) In 50% of the cases the clinical diagnosis was metropathia Adenomyosis was clinically diagnosed in only 21% of cases

(10) Only 8% of the series had associated fibroids 27% of the cases had prolapse of uterus

(11) Hysterectomy was done on 33 cases and conservative treatment in five cases

Summary

(1) Thirty-eight cases of adenomyosis from 1954-1958 are analysed

(2) The history and the clinical findings are critically scrutinised

(3) The significance of various symptoms and clinical features is discussed at length

(4) The origin of adenomyosis is briefly discussed

(5) Diagnosis and management are also discussed

Acknowledgment

I am very much thankful to the Dean, K E M Hospital for permitting to use hospital records I am also thankful to Dr V N Purandare, Hon Gynaecologist, K E M Hospital for valuable suggestions

References

1 Abel Quoted by Spatt (19), Surg Clin N America, 2, 1317, 1922
2 Benson R C and Sneeden V D Am J Obst Gyn 76, 1044 1958
3 Brines O A and Blain J H S G O, 76 197, 1943
4 Crossen R J Diseases of Women The C V Mosby Company, 1953
5 Cullen J A M A., 62 835 1914
6 Drefuss Am J Obst Gyn, 39 95 1940
7 Frank L Quoted by Spatt (19) Kentucky M J 21 568, 1923

put in the kidney tray to wash out the sticking blood and added to the cylinder This known amount of saline was deducted from the amount of blood measured to know the total amount of blood loss in ounces In every case the weight of placenta was also taken

Cases with Oxytocics

The oxytocic drug was injected with the delivery of the anterior shoulder of the baby and collection of blood loss was done in the same way as above

The number of cases treated with oxytocics were divided in the following groups See Table

In each of the group the duration of the third stage and the total blood loss was noted The results were correlated with the parity in each case The incidence of complications was observed separately in oxytocics series and normal delivery cases

Evaluation of Observations

For this purpose, cases have been divided into 3 main groups (A) Primipara, (B) II to IV para, (C) V or more para

A *Primipara* In this group 49 cases were studied (Table 1) The best results were found with intravenous ergometrine

B *II to IV Para* The total number of cases studied in this group were 133 (Table 2)

Intravenous ergometrine and methergin proved to be the drugs of choice regarding reduction of blood loss and shortening of the third stage of labour

C *V or more Para* 118 cases were studied in this group (Table 3)

Name of drug	Intramuscular	Intravenous	Total	Dose	Used
				I.M	I V
1 Ergometrine maleate	50	25	75	0.5 mgm	0 125 mgm
2 Methergin (methyl ergometrine tartrate)	50	25	75	0.2 mgm	0.2 mgm
3 Pitocin	50	nil	50	2.5 units	—
	150	50	200		

TABLE I

Primipara

	No of cases	Average duration	Average blood loss
Control cases	14	13.2 mts	6.2 ounces
Ergometrine I.M	12	7 7 mts	4 7 ounces
Ergometrine I/V	2	4 0 mts.	3.5 ounces
Methergin I/M	4	6 7 mts	4.2 ounces
Methergin I V	6	4.5 mts	4.1 ounces
Pictocin I.M	11	7 0 mts.	4 0 ounces

THE VALUE OF VARIOUS OXYTOCICS IN THE THIRD STAGE OF LABOUR

by

N KISHORE, M S , F A C S ,

Professor and Head of the Obstetric and Gynaecology Department

and

S GUPTA, M B ,M S ,

Obstetric and Gynaecology Department,

Medical College Agra

Post-partum haemorrhage has claimed increasing attention from obstetricians during the past decade as other conditions influencing maternal mortality have been brought under control It is a serious cause of maternal mortality

An attempt in this work has been made

(1) To find out the average duration of the third stage in normal full-term pregnancy cases, with estimation of normal blood loss during the stage in women in this part of the country

(2) To assess the value of various oxytocics in the third stage of labour and study their comparative values

(3) To know the incidence of any harmful effects of the drug on the third stage and compare them with the control cases

(4) To assess the effects of parity on the third stage in control as well as in drug-treated cases

Methods and Material

For the purpose of this study 100 cases of full-term normal d[illegible] were studied as controls and in 200 cases of full-term normal delivery oxytocics were tried

Patients were delivered in a dorsal position with both the knees flexed A kidney tray was placed under the buttocks of the patient as soon as the body of the baby was delivered All the blood loss of the third stage was received in the tray This method had the advantage that no liquor amnii, which usually follows the birth of the baby, was mixed in the kidney tray, which usually happens if the tray is placed soon after the delivery of the head Any clots following the delivery of the placenta were also received in the receptacle No differentiation between blood loss from episiotomies, tears and that from uterus was made but the former was kept to a minimum by appropriate measure of using small sponge separately The time of placental separation and expulsion was noted and duration of the third stage calculated All the blood collected in the kidney tray was transferred to the measuring cylinder The clots were then broken into smaller pieces by st[illegible]ring One ounce of saline was

TABLE VI

Correlation of Duration of 3rd Stage with Parity and Drug

	Control cases	I.M. Ergometrine	I V Ergometrine	I.M Methergin	I.V Methergin	I.M Pitocin	Total average
Primipara	13.2 mts	7 7 mts	4 0 mts	6 7 mts	4.5 mts	7 0 mts	5.8 mts
Para II & IV							
Para V	10.3 mts	5 4 mts	4 7 mts.	5 04 mts	3 7 mts	4.9 mts	4 7 mts
Onwards	12.3 mts.	5.3 mts.	5 0 mts	4 8 mts	3 0 mts	4.5 mts	4.5 mts.

Complications The complications in the series were only in one case out of 200 drug cases (0 5 per cent) In one case Crede's had to be done This appears to be negligible when compared to the incidence of 3 per cent as reported in the literature

Evaluation of Results

We have till now presented our observations and the evaluation From the literature it is evident that there exists a marked difference of opinion regarding duration of the third stage, amount of blood loss and the incidence of complications during the usage of various drugs by different persons

Ergometrine The following tables show the comparison between the results of various workers

TABLE VII

(Blood Loss (Ergometrine)

Year	Name	No of cases	I M	I V	Complications
1942	Davis & Boynton	1020	—	3.6 oz.	0.8 per cent
1949	Shaw	104	—	4.5 oz	—
1951	Daley	490	8 9 ounce	—	
1955	Alverez	20	—	Upto 5 oz	—
1955	Masani	100	—	„ 5 oz.	—
1955	Naidu	3006	4 6 ounces	—	—
1955	Bose	320	—	2.71 oz.	2.5 per cent
1955	Bose	100	3 63 ounces	—	2.5 per cent
1956	our	50	3 3 ounce	—	—
1956	our	25	—	2.8 oz.	—

TABLE VIII

Duration of Third State in Minutes (Ergometrine)

Year	Name	No. of cases	I.M	I.V
1951	Daley	490	15.94	—
1949	Shaw	104	—	2.9
1955	Alverez	20	—	2.4
1955	Masani	100	—	3.5
1955	Bose	320	—	5 6
1955	Bose	100	6.27	—
1956	our	50	5.0	—
1956	our	25	—	4.8

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Complications The complications in the series were only in one case out of 200 drug cases (0 5 per cent) In one case Crede's had to be done This appears to be negligible when compared to the incidence of 3 per cent as reported in the literature

Evaluation of Results

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1955	Bose	100	6.27	—
1956	our	50	5 9	—
1956	our	25	—	4.8

TABLE X

Duration of Stage

Methergin	Ergometrine	Name	Year
5 0 mts	—	Roberts	1944
7-8 "	—	J P Erndst	1946 I V
10-14	—		1946 I.M
7 0 "	—	Tritsch	1948 I V
10.3	—	"	1948 I.M
4-5	—	Schade	1950
4-5	—	Cerone	1952
4-8 "	—	Crunden	1953
3-4 "	—	Basu	1953 I V
5 6 "	—		1953 I.M
4 18 "	5 6 mts	Bose	1955 I V
5 02 "	6.27	Bose	1955 I M
3 7 "	4.8	Our observations	I V
5 1 "	5 9	Our observations	I.M

results in a diminution of blood loss In primiparas, the effects produced by methergin regarding blood loss are in many ways better than those produced by ergometrine irrespective of the route of its administration Unfortunately, a clear cut distinction between primi-, multi- and grandmultipara (V parity onwards) after the use of this drug has not been made in the literature, as such it is not possible to compare our results with those of others In multipara (II-IV para), the effects produced by methergin are better than those produced by ergometrine regarding the duration of the stage. Specially, the reduction of 1 minute in the intravenous series is very well marked Regarding the blood loss, methergin is in no way better than ergometrine

In grand multiparas (V parity onwards) also there is a marked reduction in the duration than that produced by ergometrine There is a reduction by 0 5 minute and 2 minutes than that produced by ergometrine both in intramuscular and intravenous series

In the Methergin Series it will be found that the blood loss on an average is 4 1 ounces when used by intramuscular route and 3 5 ounces when used by intravenous route This does not compare favourably with ergometrine where the blood loss by intramuscular route is even less than the blood loss in methergin used by intravenous route, while ergometrine when used intravenously still more reduces the blood loss

Our results compare favourably with those of the others and there does not seem to be a difference of opinion in that as far as blood loss is concerned, ergometrine is a better drug than methergin

Regarding the duration of the stage, it has been found that methergin when administered by intramuscular or intravenous route considerably shortens the duration of the third stage of labour In primiparas multiparas and grand multiparas the

The duration of the third stage in primipara has been reduced to 7 minutes, being 0 7 minute less than what is produced by ergometrine (7 7 minutes) Methergin is superior by 0 3 minute In multiparas and grand multiparas the results are better than those produced by ergometrine and methergin

Regarding duration it shows better results than ergometrine but is in no way better than methergin

Considering the individual results of the three drugs employed by various routes we come to the conclusion that the blood loss during the third stage of labour is reduced in primiparas from 6 2 ounces in untreated cases to an average of 4 6 ounces in cases treated by various oxytocics In multiparas, the loss is reduced from 6 8 ounces to 3 1 ounces The duration of the third stage of labour is reduced from 13 2 minutes, 10 3 minutes and 12 3 minutes to 5 8 minutes, 4 7 minutes and 4 5 minutes respectively in primiparas, multiparas and grandmultiparas

Conclusion

From this study it has been possible to arrive at the following conclusions —

(1) *Control Cases* It was found that average duration of the third stage of labour is 11.4 minutes, average normal blood loss is 6 8 ounces and incidence of complications is 3 per cent It is evident from the observations that the amount of blood loss and the duration of the third stage begins to increase after a certain parity

(2) *Drug Cases Primiparas* The best results were obtained with intravenous ergometrine in reducing the duration and blood loss

(3) *Multipara (II to IV Para)* The best results were obtained with intravenous methergin in reducing the duration of the third stage and by intravenous ergometrine in reducing the blood loss

(4) *V Para and Onwards* Same is true with this group as it is with para II to IV It has been evaluated that the drugs have significant value in reducing the duration of the stage and the blood loss in the cases with increasing parity

(5) From these observations it has been concluded that all these three drugs (ergometrine, methergin and pitocin) reduce the duration and blood loss considerably when administered with the delivery of the anterior shoulder of the baby and by far the best amongst these are intravenous methergin and intravenous ergometrine reducing the stage duration to 3 7 minutes and blood loss to 2 8 ounces respectively in the whole series when compared with the control cases of 11 4 minutes and 6 8 ounces Results of intramuscular pitocin are the same as with the other two drugs when given intramuscularly

(6) The incidence of complications is nil with ergometrine and pitocin Only in one case Crede's manoeuvre was required in intramuscular methergin series (0 5 per cent)

It can be concluded that the drug can be used beneficially during the third stage, without materially in

effects produced are slightly better than those produced by ergometrine However, in grand multiparas the results are very striking specially when used by the intravenous route

Considering methergin in all the cases, it has been found that the duration of the third stage, when given by intramuscular route, is 5 1 minutes, 0 8 minute less than with ergometrine When given by intravenous route the duration comes to 3 7 minutes, which is shorter by 1 1 minutes compared to intravenous ergometrine This shows that methergin is a superior drug than ergometrine in reducing the duration of the third stage as quoted by Riordan (1950) and Crunden (1953) Methergin is one and half times stronger in its oxytocic effect than ergometrine as shown by Gill (1947)

Complications When compared to ergometrine where the complications were nil in our series, the complications in the Methergin Series are 0 5 per cent when used by intramuscular route Out of 50 only in one case Crede's manoevure was required In the intravenous series the complications were nil It may be possible that our series is small and the complications could have been more, if there had been more number of cases Ergometrine is better in this respect

Table XI (Pitocin) More recently, pitocin has also been tried in the third stage of labour for reducing the blood loss and the duration Some workers, as Leff (1952) and Murphy (1952), have also used this drug in combination with methergin and a few have used it separately The drug in our series has been tried by the intramuscular route only In primiparas, the blood loss was found to be 4 ounces, which shows that the drug gives better results than ergometrine and methergin when used by intramuscular route The blood loss is diminished by 0 7 and 0 2 ounce as compared to ergometrine and methergin respectively In multiparas, the drug compares equally with methergin but is not better than ergometrine In grand multiparas the drug shows a reduction of 0 3 ounce from that of methergin but is in no way better than ergometrine

In the whole series pitocin stands equally with methergin but in no way better than ergometrine (Table XII)

TABLE XI
Pitocin

Name	Blood loss in ozs	Duration in minutes	Year
Danforth	Not quoted	7	1942
Murphy	3-6	3-5	1952
Bose	3.92	5 48	1955
Our observations	4 0	5 1	1956

TABLE XII

	Ergometrine	Methergin	Pitocin
Blood loss	3.3 ounces	4.1 oz.	4 0 oz
Duration	5 9 mts	5.1 mts	5 1 mts

THE MANAGEMENT OF THE THIRD STAGE OF LABOUR

by

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DEEP TRANSVERSE ARREST OF THE VERTEX

by

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Introduction

Thanks to the safety of caesarean section, high forceps deliveries and cephalotripsies are wiped out from modern obstetrics And, today, the only difficult delivery, that an obstetrician permits himself the liberty of, is one of deep transverse arrest Naturally, deep transverse arrest has become one of the most fascinating problems in today's obstetrics and more and more attention is being paid to it

Smellie was the first to recognise the condition and to realise the difficulties in its management He was also the first to use the forceps as a rotator Although, Montgomery used the term 'transverse malposition of the head', it was left to the German obstetricians to emphasize the importance of the condition, which by 1906 found a place in German text books The first English article on deep transverse arrest seems to be the one by Reed in 1902 DeLee introduced the term in his text-book in 1913 In British text-books the term appeared 23 years later (Parry Jones)

Manual rotation of the head prior to forceps extraction can be accredited to British obstetrics Forceps rotation, though first described by Smellie, found its exponents among the continental school In 1880, Scanzoni described his famous manoeuvre for cases of persistent occipitoposterior positions In 1916, Christian Kielland presented his forceps which he had devised 10 years earlier Lyman Guy Barton devised his forceps in 1924 In the years that followed, many new forceps have been devised and many new manoeuvres worked out to meet the challenge of deep transverse arrest

What is Deep Transverse Arrest?

Apart from an attempt by Parry Jones, it is difficult to find a definition of deep transverse arrest It is surprising that a term so extensively used has not yet received a universally acceptable description The adjective 'deep' is meant to indicate depth downwards from the pelvic brim Coghlan used the term 'low' transverse arrest for the condition However, Williams states that 'deep' presumably refers to depth inwards from the pelvic outlet at which arrest occurs He further suggests that, as the arrest may take place at any level the word seems to have little value and its use might be disconti-

---

Paper read at the 13th Seminar of Nowrosjee Wadia Maternity Hospital Bombay 12 on 16th March 1960

8 During this period, forceps deliveries have been mainly undertaken after Pudendal blocks For mid-cavity forceps extractions spinal anaesthesia has been used

Results

In this series there were 1,640 cases where the baby was viable out of which 69 cases were delivered abdominally This leaves 1,571 cases of vaginal delivery Out of these cases 1,522 (97 1%), including 21 sets of twins, were spontaneous deliveries There were 49 (2 9%) forceps deliveries

There were no cases of manual removal of the placenta

14 cases were estimated to have sustained a blood loss of 500 c c or more

The incidence of post-partum haemorrhage was 0 9%

98% of these cases were booked cases There were no maternal deaths and no cases of puerperal sepsis The average time between completion of the second stage and delivery of the placenta was 4 minutes There has been no case in which Crede's expressure has been used

Even the advocates of this method, however, are not agreed on the question of whether this method should be taught to medical students and midwives Even in the standard methods of dealing with the third stage, strict adherence to the principles is necessary in order to avoid disaster It should therefore not be difficult to teach both students and midwives the basic principles of the Brandt Andrews technique

I am strongly of the opinion that if this technique is more generally accepted there will be a marked reduction in the number of serious post-partum haemorrhage and of retained placentae

Summary

1 The Brandt Andrews technique of delivery of the placenta is described
2 The results in 1,571 personally delivered vaginal deliveries are presented
3 A plea is made for the teaching and for the more widespread acceptance of this method of managing the third stage of labour

References

1 Adamson T L et al J Obst & Gyn Brit Emp, 67, 243 1960

used to define the condition Besides, it is obvious that a conservative obstetrician, who is reluctant to interfere unless it is compelling, will have a lesser incidence of the condition than one who prefers early interference

Besides these 24 cases, I was extended the opportunity to manage 5 other cases of deep transverse arrest by my colleagues Thus, 29 cases form the basis of this study

Etiology

The statement that deep transverse *arrest represents arrest after partial* rotation from an occipitoposterior position is a misconception handed down by generations of text-books In fact, it is this misbelief that is responsible for the bad reputation forced on occipitoposterior positions This is not to say that deep transverse arrest cannot result from an occipitoposterior position But, certainly, occipitoposterior position is by no means an etiological factor of any importance in the causation of deep transverse arrest In only 4 cases out of the 29 in my series was the occiput in posterior position to start with

The standard teaching that the head must normally enter the brim in one of the oblique diameters has been rejected in recent years Caldwell et al (1934) have found on radiological evidence that in 60 per cent of cases the head enters the brim in a transverse position Steel and Javert have confirmed these findings It is now generally accepted that the head presents itself at the brim in a transverse position. In 25 cases in the present series the head was in transverse position throughout labour

Attention must, therefore, be focussed on finding out why in certain cases the occiput does not rotate forwards once the transverse head *comes down on the pelvic floor The* essential components of internal rotation are (1) good uterine contractions, (2) completely flexed (or extended) head, (3) efficient pelvic *floor, and (4) absence of any bony* obstruction to the rotation of the head Adequate uterine force is the essence of internal rotation and, for that reason, of any component of the mechanism of labour Again, it is uterine force coupled with the resistence offered to the head by the birth canal that leads to flexion of the head Deflexion, in the face of good uterine force, may be due to an arm under the chin, a short cord, and, perhaps, an increased extensor tone of the neck muscles A deficient perineum, either anatomically or functionally, may lead to failure of internal rotation In some cases, the pelvic architecture is responsible for the failure of internal rotation. In certain cases of flat pelvis, or android-flat pelvis and of flat sacrum it is, usually mechanically impossible for the head to rotate forwards until it is very low down in the pelvis, almost at the outlet It must also be realised that in certain cases of outlet contraction the head may just be unable to reach the pelvic floor and hence fail to rotate

In the present series, there were 19 or 65 5% primiparae and 10 or 34 5% multiparae This is in conformity with the consensus of opinion that deep transverse arrest is most common in primiparae Out of the

nued But, a head arrested at or in the brim in a transverse position is not tantamount to one arrested at the spines in the same position and differs radically from the latter in its management Hence, the adjective 'deep' must be retained and should indicate depth downwards from the pelvic inlet Or else it will be mandatory to describe the level of transverse arrest by other adjectives In this series the adjective 'deep' is taken to mean arrest in lower midcavity deep down the brim In other words, the biparietal diameter is at or just above, i e within ½ an inch of, the level of the ischial spines Arrest at a higher level in the upper midcavity generally indicates positive disproportion in the midpelvis, usually necessitates a suprapubic delivery, and should not be confused with deep transverse arrest

The word transverse does not need much clarification and indicates that the sagittal suture of the head lying more or less parallel to the bi-ischial diameter of the pelvis

Arrest signifies failure of progress of labour inspite of adequate uterine contractions As long as, either descent or rotation is being achieved by uterine contractions the head cannot be said to have been arrested It is to the mechanism of internal rotation that the word 'arrest' usually refers Yet mere lack of rotation does not signify an arrest if descent of the head is taking place It is important to realise this because in a flat pelvis the head must descend very low before rotation can occur. It need not be mentioned that internal rotation is universally accepted as a phenomenon of the second stage of labour.

In short, deep transverse arrest can be defined as a failure of both rotation and descent of the head from a transverse position at or just above the level of the spines, provided that the cervix is fully dilated and the uterine contractions are adequate Adequate uterine contractions, for the purpose, should be taken as at least 2 hours of good pains in a primipara and 1 hour of good pains in a multipara If the pains are very poor and uterine inertia alone is the cause of failure of progress of labour with the head in deep transverse position, the condition should be referred to as 'deep transverse standstill' and should be treated by intravenous pitocin drip

In the present series, these criteria were strictly adhered to before labelling a case as deep transverse arrest There were many cases where conditions like foetal distress, severe pre-eclampsia, etc , forced interference on a deep transverse head before it was arrested These cases are excluded from the present series

Incidence

During a period of 2 years, from 1st January, 1958 to 31st December, 1959, I came across 24 cases of deep transverse arrest while managing 5 450 viable confinements at the Nowrosjee Wadia Maternity Hospital This gives an incidence of 1 227 viable confinements Williams gives an incidence of 54 cases in 2 958 labours, i e 1 54 8 labours Continental authorities maintain that the condition arises in 1 5 per cent of all vertex presentations (Shaw)

The incidence of the condition will naturally depend upon the criteria

hausted by the long first stage of labour Intravenous administration of glucose and fluids is, hence, much helpful to the patient If there is uterine inertia, intravenous pitocin drip should be administered unless there exists some contraindication To my mind, the use of pitocin drip during labour is becoming something like a beautiful woman, half of the obstetricians always wanting to flirt with, while the rest always keeping shy of Whatever it may be, pitocin drip during labour is invaluable if used judiciously In the present series, there were 5 cases of uterine inertia, in all of whom pitocin drip was administered before they were stamped as deep transverse arrest In no case did pitocin drip cause any harm

Once there is deep transverse arrest spontaneous vaginal delivery is out of question Artificial aid consists in rotating the occiput forward and extracting the head by forceps The time-honoured manual rotation of the head is the most widely used procedure in the management of deep transverse arrest Inspite of all the meticulous instructions given in the text-books, in practice the procedure merely consists of grasping the head with the hand and rotating the occiput anteriorly It is commonly believed that unless the anterior shoulder is simultaneously rotated forward per abdomen rotation of the head results in the twisting of the neck Scott and Gadd have disproved this contention by radiological studies They found that when the head was rotated by Kielland's forceps the shoulders rotated spontaneously without any abdominal manipulation However, there is no denying that rotation of the head is made much easier if the shoulders are simultaneously rotated per abdomen The inevitable lifting up of the head that accompanies manual rotation is its greatest drawback and usually necessitates a rather high forceps operation Another drawback of the manual rotation is a tendency for the head to rotate backwards while the forceps blades are being applied An over-correction of the head is advocated to counter this Holding on to the anteriorly rotated shoulder per abdomen, pressure on the fundus to push down the head and preventing backward rotation of the head by applying Willett's forceps to the scalp are some of the other measures suggested

In the present series, manual rotation and forceps extraction was resorted to in 16 cases Rotation was easy in all these cases except 1 in which it was difficult but could be accomplished Proper cephalic application could not be achieved in 3 cases and this resulted in difficult extraction in 1 case and in facial palsy in 1 case The facial palsy completely recovered in 7 days The forceps extraction was easily accomplished in 10 cases but was difficult in 3 cases, and on 3 occasions the head could not be extracted after manual rotation, inspite of accurate cephalic application of the forceps In all these cases there was foetal distress at the time of operative interference and the foetal heart sounds disappeared during the failed attempts at forceps extraction These 3 cases were ultimately delivered by craniotomy This emphasises the necessity of intrapartum x-ray studies in all cases of deep transverse arrest

10 multiparae, 7 had all their previous deliveries normal, 1 had a prolonged labour resulting in stillbirth, 1 had a forceps delivery, and 1 had a deep transverse arrest in her only previous labour

Out of the 29 cases, in 12 or 41 4% the occiput was on the right side while in 17 or 58 6% it was on the left side

Nineteen or 65 5% of the cases were booked admissions while 10 or 34 5% were emergency admissions

The average weight of the babies in the present series was 6 lb 2 oz The average weight of the babies born at our hospital is 5 lb 14 oz Size of the baby, thus, seems to play no role

Lastly deep transverse arrest is not reserved only for a flexed head An extended head with a face presentation can likewise get arrested in deep transverse position

Prognosis

Once there is a deep transverse arrest, spontaneous delivery should not be expected at all If the diagnosis of the condition is based on sound and strict criteria, operative delivery is mandatory

Management

Patience is the hallmark of a good obstetrician Once the head has been in deep transverse position one must patiently wait and give the uterine forces an adequate trial In a primipara nature should not be considered as having failed until there have been good contractions for at least 2 hours In a multipara 1 hour is adequate. During this trying period one can help nature by encouraging flexion of the head by digital pressure over the sinciput during contractions At the same time one can encourage forward rotation of the occiput by digital pressure over the posterior parietal bone These two simple procedures are worth trying and although no dramatic results should be expected from them, they will show their worth in at least some of the cases One other measure, advised by Shaw, is to place the patient on the side corresponding to the occiput I have had no experience of this and would like to learn from those who have tried it What is most important during this period is that the patient must be made to bear down to her best during pains The importance of this cannot be overemphasized However it must not be forgotten that if this period is trying for the obstetrician it is even more trying for the patient especially a primipara who is often already ex-

performed at the level of arrest, neither by nature nor by brute force After a successful rotation, left blade of Neville's forceps is applied over the left blade of the Leff's forceps before the latter blade is removed Now the right blade of Neville's forceps is applied over the right blade of Leff's forceps and then the latter removed This procedure prevents the backward rotation of the head while the new forceps is being applied

As shown by Caldwell et al (1938), in certain types of pelves viz flat pelvis and android-flat pelvis, the head is best rotated in the outlet under the subpubic arch Barton's forceps is ideally suitable for bringing the head down to such a low level in transverse position and then effecting rotation As an alternative, traction by an ordinary forceps after a pelvic application to the transverse head can be used with caution This may be used with safety when the head is very low and was employed without regrets in 1 case in the series However this is dangerous to the baby and should be avoided as far as possible

In some cases deep transverse arrest is due to outlet contraction Symphysiotomy may be suitable in a few of these cases However, most obstetricians, today, would resort to caesarean section under the circumstances In this series, caesarean section was resorted to in 3 cases In two cases prospects of vaginal delivery through the narrow outlet were considered dim and caesarean section was elected as the treatment of choice In one other case the head could not be manually rotated in the cavity and it was thought that if the head were to be rotated manually one would have to undertake a high forceps delivery of the floating head Hence, the attempt was given up and caesarean section performed

Results

There was no maternal mortality in the series Puerperal sepsis developed in 2 cases Cervical tear resulted in 2 cases, in both following manual rotation and forceps extraction Lateral vaginal tear resulted in 2 cases, both delivered by manual rotation and forceps extraction

There were 6 stillbirths in the series In 1 case, the foetus had died during the first stage due to cord presentation In 2 instances, the patients were admitted as emergency cases with prolonged arrested labour and moribund foetus, the foetal heart sounds being very slow and irregular In neither of these 2 cases was the foetus considered worth a caesarean section Excluding these 3 cases, the corrected foetal loss was 3 stillbirths, i e 10 35% All the latter 3 cases were cases of foetal death resulting during failed forceps extraction after manual rotation of the head In retrospect, these cases should better have been dealt with by caesarean section Intranatal x-ray study would have been a valuable aid in the management of these cases

Conclusions

Deep transverse arrest is an open problem and there is a wide opportunity for the obstetrician's judgment and skill Vaginal delivery cannot be a matter of routine practice but should be decided upon only

Incidentally, craniotomy was resorted to in 1 other case of deep transverse arrest where the foetus had died during the first stage of labour due to cord presentation

The number of special forceps devised for rotation of the head in cases of deep transverse arrest or persistent occipitoposterior position is an eloquent testimony to the shortcomings of manual rotation Kielland's forceps, Barton's forceps, Leff's forceps, Mann's forceps, Laufe's forceps, and Miseo's forceps are but some of the efforts to provide a better substitute for manual rotation Besides this, ordinary long forceps has long been used to rotate the head and Smith has advocated Piper's forceps for the same purpose

It is not my purpose, today, to discuss the relative merits of the countless number of ingeneous gadgets and manoeuvres developed for treating deep transverse arrest I shall, however, comment on Kielland's forceps and Leff's forceps The former because it is the most commonly used forceps for rotation and the latter because my small experience with it has been very encouraging

Kielland's forceps has always been controversial Its advocates and opponents have been almost equally vociferous The classical method of application of the forceps, no doubt, has been responsible for its lukewarm reception It is little known, however that the so-called 'wandering' 'gliding', or 'migratory' method of its application was described by Kielland himself when he presented his forceps in 1916 He advocated this latter method for use when the head was lower in the birth canal or when the cervix and lower uterine segment were tightly applied to the foetal skull Recently, Chalfant has advocated 'direct' application of the anterior blade In general, Kielland's forceps is an excellent rotator and an efficient tractor but it is cumbersome to apply The sentiments at our hospital have been much against the use of Kielland's forceps and in this series only 1 case was delivered by its use There was, however, no difficulty in its use in this case Nevertheless, there are 2 other cases in the series in which Kielland's forceps application was attempted unsuccessfully Manual rotation of the head was successfully resorted to in both of these cases I have used only the wandering method of application of the anterior blade It is aptly said that it is not the forceps but the man behind it that matters Inexperience with Kielland's forceps was responsible for the failures It is rather unfortunate that with the advent of Leff's forceps our attention has been completely diverted away from Kielland's forceps

Leff's forceps is admirably suited for rotating the head Its blades are very narrow and 35-40 mm shorter than standard forceps One feature of the forceps, that has escaped attention, is that the blades are partially solid and hence better suited for rotation of the head Both the application of the blades and the rotation of the head are easy In this series it was used on 7 occasions with perfect satisfaction I have always applied the anterior blade by wandering method After applying the forceps the head must be dis impacted a little before rotation is carried out It is a fundamental principle that rotation cannot be

PREMATURE RUPTURE OF MEMBRANES

by

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Introduction

The pattern of labour is not constant in all the cases We come across patients having different types of uterine contractions Some have inertia, some have normal contractions and some have very strong pains Similarly, the time of rupture of the bag of membranes is also not constant Premature rupture of membranes has been defined as rupture of the membranes before the cervix is half dilated by Rudolf The subject "Premature Rupture of Membranes" brings into mind several questions Is the duration of labour increased or decreased after premature rupture of membranes? Are there any increased chances of intrauterine infection? Are the foetal and maternal mortality and morbidity rates increased? Contradictory statements have been made by many obstetricians who have studied the subject and contradictory results have been reported

William Smellie (quoted by King) in 1752, cautioned against rupturing the membranes, but stated "The membranes appear to play no part in labour except to hold in water necessary for lubrication Dilatation is effected by the head" Thomas Denman in 1778 stated "The amniotic fluid enclosed in membranes procures the most gentle, efficacious dilatation of os uteri", but, he has admitted, "in many cases membranes break spontaneously before the period of complete dilatation without any material inconvenience" Baudeloque in 1789 held a gloomy prognosis for dry labour even though he did artificial rupture of membranes for induction of labour

Norris and Eastman believe that premature rupture of the membranes prolongs labour and causes more pain Rotation may be arrested The cervix does not dilate properly and might become oedematous Contraction rings are prone to develop Uterine atony due to exhaustion and nervousness of the patient and operative interference are more common On the other hand, Bishop neither had any increased incidence of operative interference nor increased foetal and maternal mortality and morbidity (with premature ruptures of the membranes) Calkins found definite shortening of the first stage of labour Grier, Husbands, Kreis, Reycraft, Greenhill and others go to the extent of recommending artificial rupture of the membranes routinely in all suitable cases to induce labour electively so as to hasten the labour and to give a sense of security to the patient

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Abridged

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after a careful consideration of the pelvis For, a few cases, especially those with outlet contraction, will necessitate an abdominal delivery Knowledge of the pelvis one is dealing with is an indispensable aid even when effecting vaginal delivery Manual rotation of the head has its shortcomings and should not be advocated too lightly The number of forceps devised for rotating the head is increasing every year and one has a wide range of selection My experience with Leff's forceps has been entirely satisfactory But this does not mean that other forceps are not equally good or, may be, even better Lastly, in spite of the prolific number of manoeuvres and forceps, so ingeniously developed and devised, the last word in the management of deep transverse arrest is yet to come

Acknowledgment

I am grateful to the Honorary Staff of the Nowrosjee Wadia Maternity Hospital, especially Dr V N Purandare, for their valuable guidance and generous liberty during the management of these cases

References

1 Caldwell W E, Molov H C and D'Esopo D A Am J Obst Gyn, 28, 824, 1934
2 Caldwell W E, Moloy H C and D'Esopo D A Am J Obst Gyn, 36, 928, 1938
3 Chalfant G O Obst Gyn, 8, 308, 1956
4 Coghlan M J Med J Aust, 1, 52, 1927 (Quoted from Parry Jones)
5 Kielland C Quoted from Chalfant and from Shaw
6 Laufe L E Obst Gyn, 7, 91, 1956
7 Leff M Am J Obst Gyn, 70, 208, 1955
8 Mann J J Obst Gyn Brit Emp, 64, 351, 1957
9 Miseo A Obst Gyn, 8, 487, 1956
10 Montgomery Dublin Med Surg J, 6, 1835 (Quoted from Parry Jones)
11 Parry Jones E J Obst Gyn Brit Emp, 59, 377, 1952
12 Reed C B Ann -Gyn Pediat, 15, 402, 1902 (Quoted from Parry Jones)
13 Scott J S and Gadd R L Brit Med J, 1, 971, 1957
14 Shaw W The Practitioner, 131, 685, 1933
15 Smellie W 'Treatise on the Theory and Practice of Midwifery', edited by McClintok, New Sydenham Society, 1877, p 183 (Quoted from Shaw)
16 Smith E C Am J Obst Gyn, 73, 947, 1957
17 Steel K B and Javert C T Surg Gyn Obst, 75, 477, 1942
18 Williams B Brit Med J, 1, 865, 1953

respectively, and in multiparae 14% below the age of 30 years and 20% above the age of 30 years But Tonkes did not find such disparity and he gave the incidence of 11 9% Sunde, Atkins and Norris found it more common in primiparae than in multiparae None of them could explain why it should be higher either in primiparae or multiparae On an average, Calkins and Sunde reported an incidence of about 14%.

Etiology

No apparent etiological factor became evident after these cases were reviewed Trauma was not found to be a cause in any case There were only 7 cases with significant prenatal complications viz. 3 cases of pre-eclampsia and one each of eclampsia, mitral stenosis hydramnios and oligohydramnios, while there was 1 case of pre-eclampsia and 3 cases of anaemia in control group They might be the cause of onset of premature labour but not of the premature rupture of membranes

Twenty five per cent of patients had malpresentation and cephalo-pelvic disproportion Out of 55 vertex presentations, 5 were posterior positions and 2 had cephalo pelvic disproportion There were 6 breech presentations and 2 cases of twins The greatest incidence of premature rupture of membranes occurred between the ages of 20 and 29 years, but this is not of much significance as this is the age period during which the majority of deliveries occur One patient gave definite history of draining during a previous delivery and one, fifth para, gave history of draining for 3-4 hours during all the deliveries Munro Kerr has observed repetition of premature rupture in subsequent deliveries and so he attributed this phenomenon to unusual friability of the membranes but he did not find fragile membranes in all the cases Whether the parity plays any part in premature rupture of membranes cannot be said as no conclusions could be drawn from my small series of cases No relationship was noted between the weight of the baby and the incidence of premature rupture of the membranes

Much work has been done on this subject to find out the etiology In 1950, Knox and Horner thought that *infection of cervical canal might spread to the membranes lying over* the internal os making them inflamed and friable and therefore more likely to rupture prematurely They studied the membranes after delivery The membranes were smooth shiny and pinkish grey in colour without any evidence of inflamma*tion in control cases except in 2 out* of 12 cases While in the group where membranes ruptured prematurely all the membranes were dull and shaggy in appearance rough and thick in consistency and showed evidence of acute, chronic or mixed infection Their findings are not confirmed by any other author

Schulre, *in 1929, thought that this* phenomenon occurred due to lack of tensile strength, probably due to deficient development of connective tissue layers But Danforth, Melin and States in 1953 proved that premature rupture of the membranes was not due to the inherent weakness or strength as evidenced by

after a careful consideration of the pelvis For, a few cases, especially those with outlet contraction, will necessitate an abdominal delivery Knowledge of the pelvis one is dealing with is an indispensable aid even when effecting vaginal delivery Manual rotation of the head has its shortcomings and should not be advocated too lightly The number of forceps devised for rotating the head is increasing every year and one has a wide range of selection My experience with Leff's forceps has been entirely satisfactory But this does not mean that other forceps are not equally good or, may be, even better Lastly, in spite of the prolific number of manoeuvres and forceps, so ingeniously developed and devised, the last word in the management of deep transverse arrest is yet to come

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2 Caldwell W E, Moloy H C and D'Esopo D A Am J Obst. Gyn, 36, 928, 1938
3 Chalfant G O Obst Gyn., 8, 308, 1956
4 Coghlan M J Med J Aust, 1, 52, 1927 (Quoted from Parry Jones)
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8 Mann J J Obst Gyn Brit Emp, 64, 351, 1957
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10 Montgomery Dublin Med Surg J, 6, 1835 (Quoted from Parry Jones)
11 Parry Jones E J Obst Gyn Brit Emp, 59, 377, 1952
12 Reed C B Ann-Gyn Pediat, 15, 402, 1902 (Quoted from Parry Jones)
13 Scott J S and Gadd R L Brit Med J, 1, 971, 1957
14 Shaw W The Practitioner, 131, 685, 1933
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Methods and Material

As I was interested in finding out for myself the effect of premature rupture of the membranes, I studied 60 cases of premature rupture of the membranes with 40 control cases I included those cases who came at full-term with history of draining or having ruptured the membranes at home or who were already in the hospital and vaginal examination was done after rupture of membranes for some other indication I excluded those patients who could not give definite timing about the onset of draining or labour pains and also those patients who gave a vague history of draining and I could not make sure clinically, whether they were really draining The fallacy of the passage of urine was excluded by scrutinizing the history and by careful observation A detailed history of the patient was taken and after a general and abdominal examination, a vaginal examination was done to find out the following

1 Dilatation of the cervical canal and condition of the cervix, whether ripe or unripe The time of examination in relation to the onset of labour was noted

2 Presence or absence of the bag of membranes to know whether the forewaters had ruptured or the hind waters, if present, its character whether bulging, tense or flat

3 Condition and the level of the presenting part in the pelvis

4 The size and the shape of the pelvis

These patients were hospitalised irrespective of presence or absence of pains and were kept in bed The foetal heart sounds and mother's pulse were watched half hourly. Character of pains, the character and the amount of liquor amnii and whether it was draining continuously or intermittently were noted In some patients the membranes ruptured before the onset of pains and the interval between the onset of draining and the onset of labour was noted as the 'lag period' When patient went into labour the progress of labour, its nature and the duration of the first and second stage (combined) was noted It was not always possible to find out the demarcation between the first and second stage of labour without repeated vaginal examinations, which was not possible Condition of the baby at birth, presence of caput or excessive moulding, whether asphyxiated, birth weight and its progress were noted The mother was followed up in the puerperium for any evidence of sepsis

For control cases, I took patients at full-term who did not give any history of leaking This was confirmed by vaginal examination and by subsequent observation Abnormal cases were excluded entirely from this series

Incidence

The incidence of premature rupture of membranes has been variously quoted Atkins and Embrey found it higher in cases of contracted pelvis, malpresentation or malposition, while Alberto and Gross Rudolf did not find such difference According to Mason, it is different in multiparae and primiparae, 16% and 18%

their bursting tension Embrey in 1954 confirmed that it depends on factors other than the tensile strength He found that the average pressure required to cause rupture of the membranes was 58 9 ± 11 5 mm of mercury, and, according to Danforth, the membranes varied in thickness from 152 to 330 microns, but these figures did not help them to find any correlation between the thickness and the time of rupture of the membranes So we are still in the dark as to the exact etiology though the following are some of the factors held responsible

1 Increased intrauterine pressure, e g primiparity, hydramnios, multiple pregnancies and abnormal presentation Norris, Mason and Schulre found an increased incidence of premature rupture of the membranes associated with the above conditions

2 Badly fitting presenting part Beck said that the presenting part acts like a ball valve and thus prevents intra-uterine pressure acting directly on the bag of membranes When the presenting part does not fit the pelvis properly, intra-uterine pressure is directly transmitted to the bag of membranes and causes it to rupture prematurely

3 Trauma, accidentally or purposely, is a very rare cause

4 Undue adhesions of the membranes to the lower uterine segment which is not a constant finding

5 Premature delivery We do not know whether it is the cause or the effect of premature rupture of the membranes

6 Diseases of the membranes.

7 Degenerative or inflammatory changes of the membranes

8 According to Ballard, toxemia and syphilis appear to cause it

9 Alberto thought metritis and its consequences can cause it

Burnett reported fenestration of foetal membranes, hydrorrhea gravidarum, amniotic chorionic leakage and gravidatus exchorialis as the cause of premature rupture of membranes in some of the cases

Lag Period

The period between premature rupture of the bag of waters and the onset of labour does not seem to depend on any definite factor It was found that in the majority of patients labour sets in soon after the rupture of the membranes (Table I)

TABLE I

Onset of Labour following Rupture of Membranes

Time	No of cases
0 - 6 hours	11
6 - 12 hours	6
12 - 24 hours	2
48 - 96 hours	1
24 - 48 hours	2
More than 4 days	3

It was less than 2 hours in 52 2% of cases and it was less than 24 hours in 87 5% of cases In 6 patients, it was more than 24 hours, the longest interval being 10 days In 35 patients, membranes ruptured after the onset of labour and in 25 they ruptured before the onset of labour Out of 25 patients, 11 were primiparae and 14 were multiparae Lag period is longer in multiparae

observed that staphylococci were grown from the heart's blood in cases of premature rupture of membranes in patients who died of septicemia and who did not have any antibiotics But Roth (1954) states that infection is not more common without the use of antibiotics, and administration of antibiotics during the lag period does not reduce the incidence of infection, while they have a beneficial effect during labour and puerperium

Effect of Premature Rupture of Membranes on Babies

Out of 62 babies in the present series, 7 were stillborn, but only in two cases the intrauterine death was probably attributable to prolonged draining, with 21 hours and 4 days as lag period, which has given a high incidence of 11 29% foetal mortality Of the other five, one death was due to a tight knot in the cord One baby had exomphalos, two deaths were due to cord prolapse and one baby was lost because of the aftercoming head being arrested In the present series, 12 babies were asphyxiated while there was no death and no case of foetal asphyxia in control series One baby had fever for 3 days after lower segment caesarean section, done 18 hours after draining while in the control series there was no case showing infection

Votta Munro Kerr and Tonkes have reported increased infant mortality in cases where membranes ruptured prematurely Mcphail and Hall (1941) showed that there was an increased incidence of mild and serious apnoea, and in neonatal deaths According to them, the incidence of severe apnoea in premature rupture of membranes is 16% (5 9% in normal cases) But Ballard and Bishop disagree with them Mayer has noted feeble heart sounds in delayed rupture of membranes, attributing it to foetal compression due to persistent bag of membranes Embrey goes to the extent of saying that foetal loss is actually diminished when labour sets in within one hour after rupture of membranes but he agrees that it is doubled when lag period is over 48 hours and trebled when it is 96 hours Wolf thinks that the effect on the foetus is unfavourable when patients are treated actively after premature rupture of membranes Foetal morbidity is high because of intrauterine pneumonia, septicemia due to placental infection, cord inflammation and infection of amniotic sac

The causes of intrauterine death in cases of prolonged draining are

(i) Placental insufficiency due to retraction of uterus directly on placental site which was the cause of stillbirth in one case

(ii) Uterine infection Even though the mother might escape infection the child might succumb a few days later Holland and others thought that it became infected by swallowing contaminated amniotic fluid, but Slemons showed that in a certain proportion of cases the bacteria make their way through the amnion, covering the foetal surface of the placenta and, after invading the large vessels which lie underneath it gain access to foetal circulation and give rise to general septicemia He designed it as placental bacteremia and held that it plays a part in late foetal mortality

5 Uterine rupture occurs rarely except in the presence of pathology of uterine wall

6 Foetal asphyxia is less likely because intact membranes discourage a major degree of retraction at the placental site with its consequent reduction in its blood flow

7 Rotation in cases of occipito-posterior is not discouraged

8 *Cord may present*, but cannot prolapse

9 Foetus is very unlikely to contract intranatal pneumonia

10 The incidence of inertia and prolonged labour is not significantly altered by early rupture of the membranes but the effects of inertia are magnified, especially on foetal distress and maternal infection

Thus, it will be seen that, though the role of leaking membranes in the causation of placental insufficiency, increasing the bad effects of abnormal labour, on foetal morbidity and mortality rate and maternal mortality rate is accepted by many, there is no unanimity of opinion regarding the functions of the bag of membranes in the dynamics of the 1st and 2nd stages of labour

Effects of Premature Rupture of Membranes on Labour

The average duration of labour (1st + 2nd stage) following premature rupture of membranes was 9 706 hours while it was 8 607 hours in control cases The difference of 1 099 hours is too small to be of any significance The closer study of Table II, which compares the duration of labour among control cases and among the patients with premature rupture of the membranes, will reveal that there is a noticeable though small increase in the incidence of prolonged labour following premature rupture of the membranes

TABLE II

Duration of labour	Control	Premature rupture of members
0 - 6 hours	21	12
6 - 12 hours	14	17
12 - 24 hours	4	7
24 - 48 hours	1	3

Table III compares the duration of labour in primiparae and multiparae

The duration of labour is increased significantly by 4 hours, 55 73 minutes among the multiparae though in primiparae there is not much difference (22 8 minutes only)

Most of the deliveries occurred

TABLE III

Cases	Duration of labour (1st + 2nd)	
	Primiparae	Multiparae
Premature rupture of membranes	12 hrs 57 min	9 hrs 31 73 min
Control	11 hrs 43 88 min	4 hrs 36 00 min
Difference	0 hr 22 08 min	4 hrs 55 73 min

7 Incidence of artificial interference is increased — 6 6% caesarean section and 8 33% low mid-cavity forceps rate

8 No effect was noticed on duration of 3rd stage and there was no increased incidence of post-partum haemorrhage

9 Incidence of asphyxia was high —12 babies had it out of 53

10 There was one maternal death and 7 stillbirths, out of which two were probably attributable to premature rupture of the membranes

11 There was an increased incidence of puerperal sepsis, 11 66% morbidity in cases where membranes ruptured prematurely compared to 3 33% morbidity in control cases

References

1 Atkins H T Am J Obst. & Gyn., 58, 565, 1948
2. Bainbridge M N, Nixon W C W, and Smythe C N Brit J Obst & Gyn, 65, 189, 1958
3 Ballard Margaret B Am J Obst & Gyn, 32, 905, 1936
4 Beck Alfred Obstetrical Practice, 5th Ed, William Wilkins & Co, Beltimore, 1951
5 Bishop Edward H Am J of Obst & Gyn 48 45 1944
6 Biskind J I, and Biskind L H Am J Obst & Gyn., 73 750 1957
7 Bock A. Am J Obst & Gyn, 32, 905, 1936
8 Brown Post graduate Obstetrics & Gynaecology, 2nd Ed Butter worth & Co London, 1955
9 Burnett C W F Brit J Obst & Gyn 64, 79, 1957
10 Calkins L A. Am. J Obst. & Gyn, 64, 871, 1952.
11 Coatz Alberto S Am J Obst & Gyn., 32, 905, 1936
12 Cootz A S Am J Obst & Gyn., 46, 611, 1943
13 Cozan Henry A Am. J Obst & Gyn, 63 920, 1952
14 Danforth D N, Melin T W, and States M N Am J Obst & Gyn, 65, 480, 1956
15 Donald Ian Practical Obstetric Problems, 2nd Ed., Lloyds & Luke, London, p 372, 1959
16 Eichner E J Obst. & Gyn Brit Emp, 61 536 1954
17 Embrey Mortyn P J Obst & Gyn Brit Emp, 60 37, 1953 and 61, 793, 1954
18 Endress P Am J Obst & Gyn, 35 735 1938
19 Finlaison F H J Obst. & Gyn Brit Emp 57 423, 1950
20 Gross B J Obst & Gyn Brit Emp, 65 489 1958
21 Gross Rudolf Am J Obst. & Gyn 43 915 1942
22 Hanley Banard J Am. J Obst & Gyn 64 221, 1952
23 Kautsky J J Obst & Gyn. Brit Emp 62, 659 1955
24 King Arthur G Am J Obst & Gyn, 32 301 1936
25 Knox I C and Horner J K J Obst & Gyn Brit Emp 57, 833 1950
26 Lvandres I M. J Obst & Gyn Brit. Emp, 56 303, 1949
27 Maizeles Gerald J Obst & Gyn Brit Emp, 47 237, 1940
28 Mason Lyman W Am J Obst & Gyn, 26 394, 1933
29 Mayer A Am J Obst & Gyn 17 327 1927
30 Morton J H., Peabody C S, New drop J and Adair Fred L. Am J Obst & Gyn, 43 422 1942

would have been had membranes remained intact Some of the authorities also think that longer the lag period, shorter is the first stage and vice versa

The duration of the third stage of labour in the present series was not affected, average duration being 8 87 minutes in cases of premature rupture of membranes and 9 75 minutes in the control series There were no increased complications or increased blood loss though Calkins mentions a definite increased blood loss and increased complications of third stage of labour Only one patient had mild post-partum haemorrhage Bishop thinks that labour is shorter even in abnormal presentation with premature rupture of membranes as compared to those abnormal cases where it ruptures late in labour He found that in spite of a long lag period the labour was short

Incidence of operative interference is increased in the present series, 4 caesarean sections and 5 forceps, giving an incidence of 6 6% and 8 33% respectively Embrey, Alberto and Norris also think that the incidence of operative interference increases in these cases But Bishop and Ballard do not agree and they think that cases requiring operations showed other abnormalities besides premature rupture of membranes, while Embrey believes it is increased considerably when lag period is 48 hours or more

Effect of Premature Rupture of Membranes on Mother

There was one maternal death that could probably be attributable to premature rupture of the membranes This patient was draining for 4 days before labour set in No other abnormality was detected She had intrauterine infection and liquor was foul smelling She had very high temperature on the 4th day and died after a normal delivery, labour lasting 3 hours and 10 minutes only

Seven patients had fever for 2 days, giving an incidence of 11 66% morbidity Two of these had normal deliveries, 3 lower segment caesarean sections and 2 forceps deliveries Only one patient had draining for 5 days and one for 10 days before the onset of labour

In control series there was no death, and only two patients had fever for 2 days, giving a figure of 3 33% morbidity

It is found that chances of intrauterine infection increase if labour is induced medically or surgically compared to those cases where no artificial interference is done The cases where first stage was prolonged were more prone to infection compared to the patients who had long latent period and short first stage of labour according to Morton and Wolf Infection can develop even if no vaginal examination has been done as the bacteria from vulva might multiply in the capillary layer of fluid in vagina and readily invade open amniotic sac Maternal morbidity is increased by 20% according to Calkins He considered that if infection does not occur within 72 hours after rupture of membranes, it is less likely to occur afterwards

Woltz advocates penicillin routinely in all cases of premature rupture of the membranes and he

CHLOROTHIAZIDE FOR TREATMENT IN TOXEMIAS OF PREGNANCY

by

M D ADATIA, M.D, F C P S F I C S, D G O
Bombay

Chlorothiazide is now becoming a very popular and an ideal diuretic It is an extremely potent and orally effective non-mercurial diuretic agent, and was synthesized by Novello & Sprague in 1957 Its principal action is substantially different from mercurial and other diuretic agents and is also effective in combination with standard hypotensive drugs for the treatment of hypertension 'Chlotride', manufactured by Merck, Sharp & Dohme, was tried in cases of toxemia of pregnancy and its effects were studied

Chemistry and Pharmacology

It is known chemically as 6-chloro-7-sulfamyl-1, 2, 4-benozothiadiazine-1, 1-dioxide, and has been designated by the generic name of 'chlorothiazide' It belongs to a class of heterocyclic compounds of which the parent compound is benzo-1, 2, 4-thiadiazine

It is a colourless crystalline compound with a molecular weight of 295 7 It has low solubility in water but is readily soluble in dilute aqueous sodium hydroxide It is soluble in buffer or urine to the extent of about 50 and 150 mg per 100 c c at pH 4 and 7, respectively

Its clinical trials have been preceded by extensive studies in laboratory animals, showing that even when taken by mouth, it is uniformly and rapidly absorbed, its action starts within a few hours (Baer et al) It does not develop tolerance even after prolonged administration, and is virtually free from gastrointestinal or other disturbing side effects It is eliminated rapidly by the kidney At effective doses the compound does not alter significantly glomerular filtration rate or renal plasma flow It has also ability to counteract the salt retention of adrenocortical steroids It has a high therapeutic index, the oral acute lethal dose being 8 5 gm per kilogram of body weight in mice and more than 10 gm per Kg in rats, i e hundreds of times in excess of the maximum therapeutic dosage in man

It is mainly a saluretic agent, markedly increases the excretion of sodium and chloride and also possesses carbonic anhydrase inhibitory action (Ford & Moyer) This effect seems to be specific for the renal tubular mechanism The compound is not concentrated in erythrocytes or the brain in sufficient amounts to influence the activity of carbonic anhydrase It does not produce acidosis, or any electrolyte imbalance

Etio-pathology

The exact cause of toxemia of pregnancy is still not known but one

One-third of the foetal mortality in premature rupture of the membranes is due to uterine infection

(iii) Cord prolapse is more common but this point is disputable Bishop says it is not a frequent accompaniment, contrary to widespread opinion, because when the presenting part is able to descend far enough to exert pressure upon the forewaters to produce rupture of the membranes, it will not be so poorly adapted to inlet as to produce cord prolapse in these cases and there were no cases of cord prolapse in his series In my series, there are two cases of cord prolapse out of 60, i e an incidence of 3 3%

Management of Premature Rupture of Membranes

The patient should be hospitalised with rest in bed Antibiotics are given only to some cases where it is necessary Frequent vaginal examinations should be avoided and a sterile vulvar pad given Foetal heart sounds should be observed every half an hour, and mother should be watched for rise of pulse and temperature, dehydration, exhaustion, etc Reassurance to the patient, procuring good sleep and maintaining nourishment are important during the lag period Labour is not allowed to be unduly prolonged

When the membranes rupture before the onset of labour, there is again divergence of opinion as to whether active measures like medical induction or surgical measures like metreurynter or Voorhee's bag should be used But now-a-days surgical methods are out of fashion We have tried castor oil followed by warm enema in two cases without result Of the active measures, pitocin drip, 5 units of pitocin to a pint of 5% glucose solution, given very slowly and carefully, seems to be a safe and successful measure as advised by Ryan

Summary

1 In order to assess the effects of premature rupture of membranes on labour, 60 cases, where membranes ruptured prematurely at full-term, were studied along with 40 control cases and the results have been carefully studied and evaluated

2 Twenty cases were abnormal —4 breech, 2 twins, one hydraminos, 4 lower segment caesarean section, 5 low mid-cavity forceps, one maternal death, one normal delivery with complete perineal tear and 2 cord prolapse

3 No apparent etiological factor became evident

4 In 87 5% of cases the lag period was less than 24 hours and in 52 2% of cases it was less than 2 hours The average duration of lag period for primipara was 6 hours 34 minutes, and for multipara 37 hours 7 minutes No relation was found between the duration of lag period and the duration and the nature of the labour

5 The duration of labour was prolonged in cases where membranes ruptured prematurely The mean duration being 9 706 hours as compared to 8 607 hours in control cases

6 No prolongation of labour occurred where membranes ruptured before the onset of labours mean duration being 8 hours 58 9 minutes

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31 Munro Kerr Operative Obstetrics, 6th Ed, Bailliere, Tindal & Cox, London, 1956
32 Norris Charles C J Obst & Gyn Brit Emp, 32, 905, 1936
33 Pattison Stanley D Am J Obst & Gyn, 69, 233, 1955
34 Power H A Am J Obst & Gyn, 57, 608, 1949
35 Ryan T J Brit J Obst & Gyn, 65, 71, 1958
36 Schulre Margaret Am J Obst & Gyn, 17, 20, 1929
37 *Schumann Am J Obst & Gyn*, 62, 633, 1956
38 Short C R Am J Obst & Gyn, 43, 915, 1942
39 Sunde A Am J Obst & Gyn, 35, 734, 1938
40 Tonkes E Am J Obst & Gyn, 55, 906, 1948
41 Votta R A J Obst & Gyn Brit Emp, 62, 313, 1955
42 Wickmann S E Am J Obst & Gyn, 35, 757, 1938
43 William's Obstetrics Eastman, 5th & 11th Ed, Appleton, New York, 1924 and 1956
44 Winter F W Am J Obst & Gyn, 35, 905, 1936
45 Wolf W J Obst & Gyn, 56, 142, *1948*
46 Woltz J H E and Starkak T S J Obst & Gyn Brit Emp, 56, 143, 1946

fore the second dose is given Thus electrolyte depletion is not likely to take place within the dosages advocated even if it is continued for a long time Only in exceptional circumstances when the drug is continued in combination with diets very low in sodium or when external loss is occurring due to protracted vomiting, diarrhoea or fever, that it might lead to severe electrolyte imbalance when potassium administration might be required But further experience and time is necessary to determine the effectiveness of the drug in such conditions

Clinical Material and Results

40 cases of pre-eclampsia were tried with 'Chlotride' and are compared with a control series of 40 other cases The patients were clinically examined and their blood pressure, record of weight and complete urine analysis were done They were checked up at weekly interval Out of them, 10 patients were kept indoors for an additional therapy of a hypotensive drug These patients had history of previous hypertension or their blood pressure was more than 150 systolic Serpasil tablets of 0 25 mgms were given twice a day to them

Doses and Duration

All patients in trial series were given one tablet of 'chlotride' 500 mgms twice a day The treatment was continued for two weeks to ten weeks, depending upon the clinical response In the control series calcium tablets were given in exactly similar way

Results

The weight loss was found to be varying from about 0 lb to 18 lbs per week The complete clearance of edema was seen in 29 patients, only decrease of edema was seen in 7 patients and 4 patients showed no change in edema About 20 mm reduction of systolic blood pressure was seen in 80% of the cases The decrease in the amount of albuminuria was noted as follows —

4+ to 0 in 6 patients, 3+ to 0 in 11 patients and 2+ to 0 in 23 patients Their ages varied from 18 to 40 years and parity from I to XI, out of which seven were primiparous Studies of plasma electrolyte concentrations were not done in the series

Dosage and Toxicity

The dose administered was 1000 mgms per day One tablet of 500 mgms was given in the morning and the other, in the afternoon The onset of action was occurring in first two hours and the peak of action was in 4 to 6 hours

The only toxic manifestation noted when chlorothiazide was given to pregnant patients was mild nausea in 3 patients and occasional paresthesia of extremities, malaise and fatigue in 2 patients But continued administration did not give relief in 4 patients

In the control series similar cases were selected They were also clinically examined every week and their blood pressure, weight and urine were also checked up In every case there was marked increase in weight The weight gain varied from 8 to 13 lbs in a week They were given calcium tablets as placebo Out of

thing seems to be certain that there is some metabolic defect which leads to abnormal handling of water and electrolytes Dieckman has demonstrated that elimination of water ingested or injected is delayed in pregnant women and to a greater degree in women with toxemia of pregnancy Hughes & Venning have observed that sodium retention in toxemic women is due to increased excretion of adrenocortical steroids In any case factors responsible for excessive sodium retention or increased reabsorption should be responsible in the pathogenesis of toxemia of pregnancy (Chesley)

Increased ingestion of water leads to diuresis but with this excretion of sodium is diminished Slight edema is easily cleared out by administration of ammonium chloride But when edema is more it does not bring satisfactory diuresis Assali has found that toxemic women who have decreased sensitivity to ammonium chloride are unable to mobilize the retained amounts of sodium Mercurials bring good diuresis in cases of edema with congestive cardiac failure, but are not advisable for cases of nephritis because they might damage the tubular mechanism by their direct toxic action Recent biopsy studies have shown that the lesion of toxemia resembles nephritis (Dieckman & Potter), and thus it would be inadvisable to use mercurials for toxemic patients

Acetazolamide gives excellent diuretic effect in edema states of pregnancy but develops resistance by prolonged administration and is unable to control edema in congestive cardiac failure A synthesis of a non-mercurial compound possessing biological properties of both organic mercurials and carbonic anhydrase inhibitors has brought into existence 'Chlorothiazide'. It has undergone repeated trials and research (Novello & Sprague)

Ford & Spurr have studied and shown that Chlorothiazide is efficient in congestive heart failure and in pregnancy edema Acetazolomide is reported to have developed drug resistance (Hanley et al) while chlorothiazide maintains effective diuresis even after prolonged administration and is effective in many cases that do not respond to other diuretic agents (Finnerty et al) It is also suggested by observation and study (Finnerty et al) that possibly the action of chlorothiazide is not through inhibition of carbonic anhydrase but possibly by direct action on renal tubular transport mechanism Trials made by *Freis* et al show that oral administration of chlorothiazide has antihypressive effect and it also potentiates the effects of the hypotensive drugs and thus is a more suitable drug for toxemic cases It is observed by some workers that the antihypertensive effects of chlorothiazide, apart from the effect of excessive salt depletion, may be due to direct hypotensive action (Hollander and Wilkins) It is also interesting to note that the blood pressure of normotensive is not reduced by this drug

Another advantage is that potassium level is not disturbed by even prolonged administration of chlorothiazide Possibly because it is rapidly absorbed and starts its action immediately and gets eliminated very soon by the kidney The patients get sufficient time to get satisfactory distribution of ingested potassium be-

19	K.B.S	18	i	132,	124	116	109	190/130 140/100	170/130	140/100	Nil	Weak Hospitalized	Weak 2 12	Cleared	+ – +	
20	A.D.V	20	i	147	137			140/90	120/80		Nil	Good	Good 6-6	Decreased	+++	„
21	A.A.M.	23	ii, 1 FTND	144 131	138, 128	136 122	131	140/80 130/90	120/80 130/90	110/70 120/80	Nil	Weak	Good 8 lbs.	Cleared	++	Cleared
22.	B.C.S.	25	iii 2 FTND	115	110			140/70	120/80		Nil	Good	Good 5-3	Cleared	++	„
23	B.J.S	29	iv 3 FTND	130	127	123	120	130/70 115/80	120/80	100/80	Nil	Good	Good 7-3	Cleared	++	
24	B.H.M.	23	iii 1 FTND 1 LSSC, Pl Previa	135	127	127	128	140/110 120/80	140/110	140/90	Paresthesia & Fatigue	Good	Good 6-1	Decreased	+++	,
25	C.J.P	32	v 3 FTND 1 Abort.	1.3	102,	104		150/90	150/100	110/80	Nil	Weak	Good, 5-12	Cleared	++	
26	D.D.J	20	ii 1 Premature 8 mths. stillborn	107	98,	96		160/100	120/80	120/80	Nil	Hospitalized	Good 6-2	Cleared	+++	„
27	D.H.M.	31	v 4 FTND	111	106	104		140/100	140/100,	120/80	Nil	Good	Good 5-8	Cleared	++	,
28	D.K.B	27	vi, 5 FTND	144	145	147	147	120/80 130/110	140/100	130/100	Nil	Good	Good 7	No change	++	„
29	L.D.D	25	iii 2 FTND	160	153,	154		140/90	140/90	120/80	Nil	Good	Good 8-8	Cleared	++	„
30	L.T.J	35	viii 3 FTND 4 Abortions	134	128	127	121	150/90 120/80	140/90	140/90	Nil	Good	Good 7-13	Cleared	+++	„
31	L.M.T	30	vi 6 FTND	156	151	146		140/90	130/90	120/70	Nil	Good	Good, 7-7	Decreased	++	„
32	L.L.K	29	viii 4 FTND, 2 Abortions	138	138,	121		140/80,	130/80	130/90	Nausea	Good	Good 7-2	Cleared	++	
33.	L.B.M	?7	iv 3 FTND	143	134	134		140/100	120/80	120/80	Nil	Good	Good 7-2	Cleared	+++	„
34	L.V.M	22	ii 1 FTND	147	139	136		150/100	150/100	140/90	Nil	Good	Good 5-4	Cleared	++++	„
35	L.P.P	38	viii, 7 FTND	118	109			170/110	140/90		Nil	Hospitalized	Good 5-14	Decreased	++	„
36	L.C.S	35	ii 1 FTND	146	140	131		160/100 130/90	150/100	140/90	Nil	Hospitalized	Good 6-8	Cleared	+++	„
37	M.K.T	25	iv 3 FTND	132	132,	134	135	140/80 120/90	140/80	120/80	Nil	Good	Good 7-10	No change	++	
38	M.K.M	33	viii, 7 FTND	111	93, 92,	91	94	230/128, 150/100	210/120//180/110 140/90		Nil	Weak Hospitalized	Stillborn	Cleared	+++	„
39	M.M.K.	22	i	143,	131	131		140/100	130/90	130/90	Nil	Good	Good, 6-7	Decreased	++	„
40	M.S.M.	38	xi 8 FTND 2 Abortions,	164	157	148		150/100	140/90	130/90	Nil	Good	Good, 7-2	Cleared	++	„

18.	S V.P	25	iii 2 FTND	131 144	131	140	143	160/100 150/90	150/90 150/90	160/90	Nil	P P H Blood transfus on	Good 5-6	Increased	+ − +	
19	S.K.J	33	vi 5 FTND	102	103	105,	105	140/80 150/90	140/90 160/100	140/80	Nil	Good	Good 7-10	Present	+ +	
20	S.T V	19	ii 1 FTND	108	111	112		140/90	140/70	140/80	Nil	Good	Good, 6-1	Present	+ +	Cleared
21	S.K.S	19	i	106	116	119		140/80	140/100	140/100	Nil	Good	Stillborn	Present	+ + +	
22	S C.B	24	iii, 2 FTND	147	155	158		130/80	130/90	130/90	Nil	Good	Good, 6-10	Present	+ + +	
23	V.K.P	30	vii, 6 FTND	107	117	119		120/80	130/90	130/90	Nil	Good	Good, 7-6	Present	+ +	
24	V.J.P	24	iv 3 Abortions	101	108	119		130/90	130/90	140/100	Nil	Caesarean Section	Good 7-4	Present	+ + +	
25.	V.P.R.	34	vi, 3 FTND 2 Abortions	137	140	144		130/80,	140/90	140/100	Nil	Good	Good 6 2	Present	+ +	
26	V.B.D	35	vi, 4 FTND 1 Premature	107	117	109	112	130/80 170/110	160/100	150/110	Nil	Anaemic	Good, 5 2	Decreased	+ + +	
27	U.K.M.	21	ii 1 Abortion	104	114	114,	119	130/90 130/90	130/90	140/100	Nil	Good	Good 6	Present	+ + +	
28	Y P.M.	25	i	120	128,	130	131	130/90 160/120	172/125	180/120	Nil	Breech Delivery	Weak	Present	+ + +	
29	T M.M	39	vii, 6 FTND	127	129	129	129	130/80 140/100	130/90	140/100	Nil	Good	Good, 6	Decreased	+ + +	
30	T.D.B	35	viii 6 FTND, 1 Abortion.	140	142,	143,	143	130/90 130/100	160/110,	130/100	Nil	Good	Good 7-3	Present	+ +	Cleared
31	T.B.P	26	v 3 FTND 1 Abortion	109	112	113	115	125/90 160/110	154/100	130/90	Nil	Treated with Digoxin	Twins, 4-2 & 4 4	Present	+ + +	
32	S B.S	32	v 4 FTND	166	168,	173,	164	130/90 150/110	140/100	150/105	Nil	Good	Good, 6-4	Present	+ + +	
33	S U G	38	viii, 5 FTND, 2 Abortions.	128,	136	139	140	110/90 142/110	130/90	130/90	Nil	Mid-Cavity Forceps	Stillborn	Present	+ + + +	
34	R.M.A.	25	iv 2 FTND 1 Abortion	137	139	144		140/100	150/110	160/110	Nil	Good	Good 5 2	Present	+ +	
35.	R.J C.	21	i	135	142	149		120/80	120/80	130/90	Nil	Weak	Good 5-5	Increased	+ +	
36	S.K.P	26	iv 2 FTND 1 Abortion	108,	108,	107,	110	140/100	130/90	150/110	Nil	Obstetric Shock	Good, 7-2	Present	+ + +	
37	S V G	20	ii 1 FTND	110	114	119	124	120/80 150/100	130/90	150/100	Nil	Good	Good 6-12	Present	+ + +	
38	S.N.J	30	vi 5 FTND	143,	147	151		140/100	150/110	150/110	Nil	Good	Weak 4-9	Present	+ + +	
39	S.J L.	30	vii, 6 FTND	140	148	150		130/80	150/100	160/110	Nil	Good	Good, 7	Present	+ + +	
40	T.P B	28	iv, 3 FTND	114	124	125	128	130/80 140/100	130/90	130/90	Nil	Forceps delivery	Good 7-4	Present	+ +	

	SPR	28	iv, 3 FTND	120	123, 126, 132 131, 138	110/90 116/110, 150/100, 150/100, 160/110	Nil	Good	Good, 6-10	Present	+++	
	SJS	29	iii, 2 FTND	151	161, 169, 173	110/80, 110/80, 110/80, 130/80	Nil	Obesity	Good, 8-8	Present	+++	
	SKJ	30	xi, 8 FTND, 2 Abortions	92	98, 96	130/90, 130/90, 120/90	Nil	Good	Good, 4-15	Decreased	+++	Cleared
	SSD	20	i		121, 120, 126, 128	140/80, 120/80, 140/90, 110/70	Nil	Good	Good, 5-5	Present	+++	
	SVG	35	iii, 1 FTND, 7 mths 1 Premature,	118	118, 122	170/110, 160/100, 160/100	Nil	Good	Good, 6-5	Present	+++	
	SNB	30	v, 4 FTND	110,	149, 149, 152, 151	124/80, 170/120, 130/100, 160/110 180/120	Nil	Good	Good, 5-8	Present	+++	
	SGP	28	iii, 2 Abortions	112,	115, 115, 121	110/90, 160/100, 160/100, 170/100	Nil	?Pl Previa	Good, 6-9	Present	+++	
	SRG	25	vii, 6 FTND, 3 girls, living, 3 boys died	171,	172, 176, 180, 188, 189	140/100, 120/80, 120/80, 150/100, 180/110, 180/90	Nil	Good	Good, 6-12	Present	+++	
0	RAM	23	iii, 2 FTND	96	100, 104, 109, 109	140/90, 120/80, 140/100, 150/110, 140/80	Nil	Good	Good, 6-8	Present	+++	
0	RSG	25	v 4 FTND	98	106, 101	120/80, 130/90, 140/80	Nil	Good	Good, 7-14	Decreased	+++	
1	RKS	35	v, 1 Premature 1 FTND, 1 Abort, 1 ectopic	151,	150, 164	150/100, 130/90, 170/110, 190/120	Nil	Good	Stillborn	Present	+++	
2	RSM	30	vii, 5 FTND, 1 Abortion	205,	199, 204, 206	140/100, 140/80, 140/80, 140/100	Nil	Weak	Good, 5-2	Increased	+++	
3	SST	33	vii 6 FTND	116,	121, 122	130/80 140/100, 140/80	Nil	Good	Good, 8-12	Present	+++	
1	SRS	21	i		112, 114, 117, 121	140/90, 130/90, 130/100, 150/110, 150/100	Nil	Good	Good, 5-7	Present	++++	
5	SVS	35	vi, 4 FTND, 1 Abortion	99,	98, 100, 105	158/120, 130/90, 160/110, 220/150	Nil	Post-partum psychosis 2 years back	Stillborn	Increased	+++	
16	SKS	20	iv, 3 FTND	117	116, 156, 153	110/90 130/80, 120/100 110/100	Nil	Good	Good, 8-9	Present	++	
17	[illegible]	[illegible]	[illegible] 1 FTND	123	125 128, 129	110/90 130/80 110/80, 130/80	Nil	Good	Good 8-4	Present	++	Cleared

diuretic It also enhanced the potency of antihypertensive agents

The absence of toxic manifestations, excepting the symptoms of mild nausea, occasional paresthesia, malaise and fatigue, make it an ideal drug Only four cases did not respond to chlorothiazide therapy

Chlorothiazide is thus observed to be a valuable adjunct to current methods of treating pre-eclampsia patients

References

1 Assali N S, Herzig O and Singh B P J Appl Physiol, 7 367-374 (Jan) 1955
2 Baer J E., Leidy L. and Brooks A. V Fed Proc, 16 278 1957
3 Chesley L. C, and Chesley E. R Am J Obst. & Gyn 45 748 (May) 1943
4 Dieckman W J and others Am J Obst & Gyn, 58 1014 (Nov) 1949
5 Dieckman W J Potter E L. and McCartney C P Am J Obst & Gyn, 73, 1-16 (Jan) 1957
6 Finnerty Frank A (Jr) Joachim H Buchholz, and John Tuckmann Jour Amer Med. Asso, 11, January 1958
7 Ford R V and Spurr C L. Am J Med, 22, 965 (June) 1957
8 Ford R V Moyer J H, Spurr C L, and Handley C M Rec & Ann, 51, 376-378, (April) 1957
9 Freis D Edward Wanko Annemarie, Wilson Ilse M. Parrish Alvin E. J Amer Med Asso, 11, January 1958
10 Hanley T and Platts M M. J Clin Invest, 35 20 30 (Jan) 1956
11 Hollander W, and Wilkins R W Boston M Quart 8 69-75 (Sept) 1957
12 Hughes E. C and others Am J Obst & Gyn 67 782-800 (April) 1954
13 Novello F C and Sprague J M. J Am Chem Society 79 2028-2029 (April 20) 1957
14 Venning E. H Carballeira A, and Dyrenfurth L J Clin Endocrinol 14 784, (July) 1954

the 40 cases, edema decreased in 4 cases only by bed rest Five cases showed increase of edema and rest of them showed persistence of edema Blood pressure also remained high or increased in many cases The albuminuria was cleared up in 4 cases and the rest of them did not show any change Their ages varied from 19 to 38 years and parity from I to XI, out of which 6 were primiparaes So far as the variation in weight was concerned 2 of them reduced in weight, 3 remained constant and remaining ones increased in weight The maximum increase of weight was 19 lbs

Comments

In 30% to 40% of normal pregnant women, edema of varying degrees appears from the fifth or sixth month of gestation without rise of blood pressure or albuminuria, but it subsides with rest in bed, elevation of the foot of the bed and restriction of salt in the diet These patients under trial were also selected and everyone had definite edema, albuminuria and rise of blood pressure They were compared with similar cases who were given only bed rest and no medication except calcium tablets

Initial weight loss in the cases under trial was most marked in the first week They were all taking usual balanced salt diet Only excess of salt was omitted In 4 cases, in whom it was continued for even eight weeks, no reduction of edema was observed, and the tablets were not found to be effective

Apart from diuretic properties, chlorothiazide also showed definite antihypertensive effect It had no toxic effects and nobody developed tolerance but 4 cases did not show reduction of edema The greatest advantage was that it could be given orally in very simple dosage schedule (twice a day, morning and afternoon) No restriction of salt was imposed on the patients and this created a great pleasing effect on them

Whenever more reduction of blood pressure was necessary a small dosage of serpasil was added which gave very satisfactory results

Thus chlorothiazide was an ideal diuretic for the treatment of toxemias of pregnancy If given alone at the first sign of excessive weight gain or slight elevation of blood pressure it would frequently reverse the toxemic process This property would enable chlorothiazide therapy to be started at the first prenatal visit, for the hypertensive patient who is more prone to develop toxemia When given in combination with Serpasil in the patient with severe toxemia, chlorothiazide, in addition to exerting its diuretic effect, greatly enhanced the potency of the antihypertensive agent Four cases, for unexplainable reasons, did not respond to chlotride

Summary

40 patients with edema, albuminuria and hypertension or toxemia received 'Chlorothiazide' and its results are compared with a control series of equal number It produced very effective diuresis in most of these patients The reduction of edema and lowering of blood pressure was very significant compared to the control series It was found to be potent orally, and an active non-toxic

TABLE 1

Grade	Puerperal tetanus					Tetanus in general				
	Total no of cases	% Incidence	Recovered	Died	% Mortality	Total no of cases	% Incidence	Recovered	Died	% Mortality
I	2	3.99	2	—	0 00	211	10.51	211	—	0 00
II	5	7 46	5	—	0 00	264	13.15	247	17	6 4
III	9	13 43	8	1	11.1	407	20.23	300	107	26 3
IV	23	33.33	7	16	70 0	645	32 14	282	363	56.3
V	28	41.79	2	26	92.9	480	23.97	89	391	81.5
Total	67	—	24	43	64.2	2007	—	1129	878	43 7

TABLE II

Tetanus following Delivery

Grade	Total no of cases	% Incidence	Recovered	Died	% Mortality
I	2	9.10	2	—	—
II	2	9.10	2	—	—
III	6	27.30	5	1	16 66
IV	8	36.32	2	6	75 00
V	4	18.18	1	3	75 00

TABLE II (A)

Grade	Delivery at home		Delivery at hospital	
	Recovered	Died	Recovered	Died
I	1	—	1	—
II	2	—	—	—
III	2	1	3	—
IV	2	6	—	—
V	—	2	1	1

PUERPERAL TETANUS

by

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Puerperal sepsis is a serious and frequent complication of childbirth Tetanus is reckoned as a rare variety of puerperal sepsis, and is regarded as one of the gravest dangers of childbirth Expert obstetric management under the guidance of experienced personnel has considerably eliminated the risk

The incidence of puerperal sepsis in general, and of tetanus in particular has fallen appreciably with rising standards of asepsis and obstetrical care Unfortunately, in this country, still much remains to be done Deliveries are still being conducted by uneducated midwives 'dais' who do not know what asepsis means Obstetric patients are nursed on the floor, which is made up of manure and straw Dirty rags and native medicines are employed freely for local use In these circumstances it is surprising that many more cases of puerperal tetanus do not occur

It is interesting to note that except [illegible] report of puerperal tetanus no collected series of cases have been published in India where according to Knight the conditions for the occurrence of post-partum tetanus would seem ideal B Bernard Weinstein et al in 1941, made this comment while reviewing the literature on puerperal tetanus Since then [illegible], Dave et al have reported series of 103 cases of puerperal tetanus in 1955

Review of world literature reveals that the incidence of puerperal tetanus is very low Ramsay et al encountered, in 31 years, only one case of tetanus following delivery among 6,000 cases of puerperal sepsis Hubner & Frendenberg in 1954 reviewed 1,894 cases of tetanus due to all causes with 930 deaths (49%) In this series, 39 cases of puerperal tetanus were reported following abortion, with 27 deaths (69%), Vinay in 1894 reviewed 106 cases of puerperal tetanus Sepet in 1898 reported 125 cases, 48 following abortion, 77 following normal delivery Schneider in 1926 reported 109 cases Bosh reported 5 cases following induction of abortion by cervical pack, in a hospital

Material and Methods

Over a period of four years, from November 1954 to October 1958 2,007 cases of tetanus were admitted into the tetanus ward of the King Edward Memorial Hospital, Bombay 12 Of these 67 cases were puerperal tetanus, thus giving an incidence of 3 3% of all cases Unfortunately we do not have an obstetric unit in our hospital, so we are unable to state what proportion of patient

Forty-five out of 67 cases of puerperal tetanus followed after abortion. Of the 45 cases of tetanus following abortion, 34 ended fatally—mortality being 75 55% as against 45 45% mortality of tetanus following delivery In 8 patients there was history of induced abortion, in 7, by local interference and manipulations and only in 1, by oral medication Only in one case a foreign body was detected, a 6 inch long stick in the uterus and cervix and cotton plug in the vagina In two cases in which abortion was mechanically induced there was definite evidence of septic abortion In 19 cases there was no such history or evidence of artificial induction and it appeared that these were cases of spontaneous abortion In 18 cases no history of induction of abortion was obtainable but there was scepticism about the veracity of the statement and so these cases were classified as "? induced abortion" In none of the cases was there any evidence of injury or foreign body in the genital passages One had spontaneous abortion but there was obvious septic complication Four patients were unmarried and one was married but staying away from her husband for several years

Discussion

Puerperal tetanus may either follow a full-term delivery or an abortion In the present series there are 22 cases following delivery and 45 cases following abortion. This difference can be due to several reasons People are more conscious about deliveries and, with increased facilities and more knowledge about dangers of home delivery, more and more women prefer confinement in hospital where obviously chances of infection are at minimum This is not so with abortion Women are reluctant to go to hospital following an abortion unless complicated by severe pain, profuse bleeding or infection Proper care is not taken at home, and dirty rags are used as vulval pads Also, abortion may be induced by the patient, relation of the patient or a professional abortionist — who are quite ignorant of the dangers involved

As tetanus organisms may grow and develop in any wound it is not necessary that they may be actually introduced in the uterine cavity, a small perineal tear is quite sufficient and may be the portal of entry

The reasons for the higher incidence of tetanus and that of mortality, following abortion are several Massive infection due to mechanical interference, greater negligence on

TABLE III(A)

Grade	Spontaneous abortion		Induced abortion		? Induced abortion	
	Recovered	Died	Recovered	Died	Recovered	Died
I	—	—	—	—	—	—
II	—	—	—	—	3	—
III	—	—	2	—	1	—
IV	1	5	1	2	2	3
V	—	13	—	3	1	8

Table No III(A) shows the incidence and the grade of tetanus that followed spontaneous abortion and induced abortion

with puerperal sepsis developed tetanus

Grading of Tetanus

Tetanus is attended with a high mortality Different authors have claimed usefulness of various remedies and have used different criteria for determining the severity of the disease In order to determine the prognosis of the disease, we have devised a grading system based on five criteria and these are

1 Lockjaw
2 Spasms
3 Incubation period of 7 days or less
4 Period of onset of 48 hours or less
5 Axillary temperature of 99°F or rectal temperature of 100°F on admission or within 24 hours of admission into the hospital

Those cases which have all the five criteria mentioned above belong to the severest group and are termed Grade V, those having any four of the five as Grade IV, those having three as Grade III, two as Grade II, and those having one of the above five were regarded as Grade I

The criteria used in our grading are well known and recognised by almost all workers in the field We have shown in our paper that with reasonable accuracy the severity of the patient's condition can be judged

Table I shows the grading of these 67 cases of puerperal tetanus and their mortality rate as compared with the general mortality rate of tetanus from all causes

The incidence, and rate of recovery of tetanus following delivery are given in Table II and II(A) Most of the cases were severe (grades IV and V) 22 cases of tetanus developed after delivery, of these 16 were delivered at home and 6 were delivered in the hospital Of these 6 cases, vaginal manipulations were done in only 2 cases In one case abdominal sterilisation was carried out These 3 cases recovered In the other three cases, delivery was normal and no manipulation was done —(whether vaginal examination was done or not could not be verified)—of these, one patient expired and two recovered Thus mortality of tetanus following delivery in a hospital in our small series was 16 66%

Table II(A) shows that those delivered at home were not only more in number but also had a higher mortality

The severity of tetanus (grades IV & V) following abortion and its high mortality are shown in Table III

TABLE III

Tetanus following Abortions

Grade	Total no of cases	% Incidence	Recovered	Died	% Mortality
I	—	—	—	—	—
II	3	6 67	3	—	—
III	3	6 67	3	—	—
IV	14	31.11	4	10	71 43
V	25	55.55	1	24	96 00

A CASE OF THORACOPAGUS TETRABRACHIUS TETRAPUS

Anatomical and Obstetrical Aspects

by

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Introduction

The great rarity of conjoint twins demands a detailed study of all such freaks The problem has been of interest to embryologists and obstetricians alike But recently, the subject has assumed a greater importance, since the surgical separation of Siamese twins of Kano by Ian Aird (1954) This problem of surgical separation demands that the gross anatomy of these cases should be very well known Therefore, the obstetrical and anatomical aspects of a case of Thoracopagus are being presented below

Case Report

T R aged 28 years was admitted for her fourth delivery on 14th April 1960 at 10 P.M She was in labour since 6 P.M membranes had ruptured at 7 P.M and a foot had prolapsed at 8 P M Of her 3 previous pregnancies the second had ended in a twin delivery with survival of the second baby

The uterus was tense presentation and position were difficult to make out Foetal heart sounds were not heard Uterus was contracting every 3 minutes When examined internally both legs with breech of a foetus were found at the vulva cord was palpable but there were no pulsations On deeper examination a bridge of soft tissue was felt connecting the two bodies, possibly at a level above the umbilicus

As contractions of the uterus were strong it was decided to terminate labour by the vaginal route under anaesthesia with a provisional diagnosis of a xiphipagus con joined twin An attempt to turn the joint area so as to deliver the babies without destruction had to be given up for lack of uterine relaxation and space

The fourth leg was pulled out and with traction on legs it was noticed that there was a common cord to both foetuses Deeper examination revealed a thoracopagus union A Jardine s hook was passed and in the attempt to separate the two foetuses it was found necessary to cut viscera which included a liver bridge and a heart. When arms were delivered it was found impossible to extract one head at a time. Decapitation of the larger foetus completed the delivery The third stage and puerperium were uneventful

the part of the patient, and taking medical advice too late, because of gilt complex

The mortality figure in our series of puerperal tetanus is quite high In the series of 115 cases collected over 11 years (August 1943 to July 1954) from the same institution, Dave et al reported a mortality of 59% Seventy-four of their cases followed abortion and 41 followed delivery, the mortality in 2 groups being 65% and 49% respectively The average mortality of tetanus during the same period varied from 41 to 54% In the present study, though the overall mortality of general series was 43 2%, mortality of puerperal group remained high, i e 64 2% This also indicates that puerperal tetanus is severe, and it is difficult to lower the mortality even with improved management and treatment As could be seen from Table I, there is higher incidence of grade IV and V (75%) in puerperal tetanus as compared to occurrence of (56%) cases in the same grade in the general series

Summary

1 67 cases of puerperal tetanus were detected out of 2,007 cases admitted to the King Edward Memorial Hospital during a period of 4 years

2 The incidence of puerperal tetanus was 3 33%

3 The mortality of puerperal tetanus was 64 2% in comparison to the overall mortality rate of tetanus which was found to be 43 7% Higher mortality is due to larger number of cases being in grades IV and V

4 Tetanus following delivery in the hospital had the lowest mortality Tetanus following abortion had a higher mortality than that following normal delivery, whether at hospital or at home

Acknowledgment

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References

1 Adams J Q, and Morton R F Am J Obst & Gyn, 69, 169, 1955
2 Bush W L J A M A, 116, 2750-2751, 1941
3 Dave B T, Satoskar R S, Joag G G, Patel J C, and Lewis R.A J Postgrad Med, 1, 4, 1955
4 Munro Kerr, 'Combined Textbook of Gynaecology and Obstetrics', p 619, 1944 edition, E & S Livingstone Publishers, Edinburgh
5 Patel J C, and Joag G G Ind J Med Sci, 13, 834-840, 1959
6 Ramsay A M, France E M, Dempsey B M Lancet, 2, 548-550, 1956
7 Weinstein B B, and Beacham W D Am J Obst & Gyn, 42, 1031, 1941

In both the foetuses the urachus was patent near the bladder end

Central nervous system was not examined No evidence of abnormalities of skull or spine was seen

The twins had a single umbilical cord which on section was found to be made up of one umbilical vein and four umbilical arteries

Comment

The findings of multiple pairs of one set of extremities during an internal examination immediately arouses in the mind of the obstetrician the possibility of monoamniotic twins either separate or conjoint A thorough search proved that no heart sounds were heard Though pulsations were not felt in the prolapsed cord, auscultation of foetal heart sounds of good rate would require an immediate caesarean section with the possible salvage of a separate monoamniotic twin Subsequent to the paper of Quigley (1935), several others have reported the need for extra care in the salvation of foetus in this condition, chiefly because of risks of complications of the cord

The obstetrician is also faced with a further dilemma on the method of delivery even after a diagnosis of conjoined twins has been made, if foetal heart sounds were heard Is he justified in performing caesarean section to deliver Siamese Twins with a prospect of their subsequent existence and possible surgical separation? Or is he justified in performing a destructive operation with the view that as in such cases gross anatomical abnormalities and deficiencies in development are noticed? However, from a humanitarian point of view even with the minimum possibility of survival, it should be felt today that a caesarean section is justifiable

It is generally believed that monozygotic twins form as a result of cleavage of fertilised ovum into two separate embryos Rarely, this separation is incomplete, giving rise to conjoint twins This splitting can occur any time, between the blastula and primitive streak stage If it is interfered with, in the period between 13th to 15th day of postfertilisation period, Siamese twins will result

After a careful scrutiny of the anatomical findings of this case, the authors are led to believe that conjoint twins can also develop, as a result of fusion between the monozygotic twins in a common chorioamniotic sac This surmise is substantiated by the juxtaposition of the right lateral surfaces of two livers, complete development of the extrahepatic biliary system and the presence of four umbilical arteries and a single umbilical vein in the umbilical cord The site of fusion of the two embryos can be made out at the gap in the anterior abdominal wall in the region of the future umbilicus and its upward continuation between the two sternal plates The probable time relationship can be located to a period just before the herniation of midgut loop At this stage the two sternal plates are also separate The findings in the hearts are also suggestive of a transient interference in the morphogenetic process at this stage

Summary

A fourth gravida aged 28 delivered conjoint twins The delivery was obstructed due to compound

Anatomical Findings

The conjoint twins were full-term females, weighing 6 lbs 14 oz Externally they presented a gap in thorax and upper abdomen, through which the viscera of the two were in continuity Both upper and lower extremities of both the foetuses were fully developed and did not show any evidence of malformations

The line of fusion extended from the third ribs of both the foetuses and continued down to the hypochondria and epigastrium As a result of this, the sterna were represented by two cartilaginous manubria In this area, the line of fusion involved all the layers from skin down to the bones The union of the twins was of face to face type

Right Foetus On opening the thoracic cavity, a very large thymus was seen, completely masking the left lung The two pleural cavities were well formed and fully separated from other cavities Right lung was divided into four lobes, the accessory lobe being the infracardiac one Left lung was made up of three lobes, with a very well marked lingula

The two hearts were united along their adjacent surfaces The heart of the right foetus was a four chambered one, showing an interatrial septal defect The right atrium received the two vena cavae The left atrium received three pulmonary veins at its right end and was fused with the sinus venosus of the heart of the left foetus The mitral opening was very wide Tricuspid opening was normal The auricular appendices were well formed The left ventricle was fused with the right ventricle of the left foetus on its external aspect only The cavities of the two did not communicate The papillary muscles of the mitral valve were rudimentary Aortic valve was normal Right ventricle, tricuspid and pulmonary valves were normal The relative positions of aorta and pulmonary trunks were normal Ductus arteriosus was normal No interventricular septal defect was found The arch of the aorta gave origin to right common carotid and right subclavian arteries instead of the brachiocephalic

In the heart of the left foetus, the atria were represented by a common chamber which received the entire venous drainage of the body, namely, the right and left superior vena cavae, inferior vena cava and two right and one left pulmonary vein From the right and left aspects of this chamber the respective auricular appendices were projecting This chamber communicated with left atrium of the heart of the right foetus, and can be called a Sinuatrial chamber of the heart of the left foetus Right ventricle was massive and occupied the anterior aspect The left ventricle occupied a posterior position The two ventricles freely communicated with each other through a wide interventricular septal defect There was a dextroposition of aorta and pulmonary trunk with both the vessels arising from both the ventricles The valves of the heart, ductus arteriosus and branching of arch of the aorta were normal

The right lung was divided into four lobes including an infracardiac lobe, and the left lung was divided into two lobes only

The twins had a common diaphragm, lying at the normal level The diaphragm had no congenital defects

The two livers were united in such a way that the fusion took place on the right surfaces of both the livers It can be surmised that this took place by a rotation of the right liver through 180°, as evidenced by the dextroposition of the gall bladder and entry of inferior vena cava into the liver This rotation was permitted by persistence of a duodenal mesentery Consequently the right common bile duct opened on the right side of the duodenum A single umbilical vein entered the midline portion of the liver and divided into right and left branches A tonguelike process of liver tissue overlay that spot

Rest of the gastrointestinal tracts of both the foetuses were separate Stomach, pancreas and spleen were normal in both foetuses Except for the presence of Meckel s diverticulum in both the foetuses, gastrointestinal tracts did not show any abnormality

Both the kidneys of the right foetus and the right kidney of the left foetus were polycystic All the four ureters were normal

CONJOINED TWINS (THORACOPAGUS)

A Case Report

by

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This case of Thoracopagus conjoined twins is reported because the condition is quite rare and it is only once in a life time probably that an obstetrician is confronted with the problem of delivering such a monster As Munro Kerr states, "Few medical men are called upon to conduct a labour in which the product of conception consists of a double monster, and even obstetric specialists of considerable experience may see no more than one or two in a life time" Evidently therefore the experience of an individual obstetrician in dealing with this problem is likely to be limited My idea, in reporting this, is to add to the common pool of knowledge which would be useful to the obstetrician who might be called upon to manage such a case

This case also presents certain unusual features regarding the antenatal diagnosis of this condition

Case Report

The patient Mrs P D 22 years old second para came to me for registration for confinement on 18-4-1959

At that time she was about 32 weeks pregnant her last menstrual period being on 6th September 1958 and probable date of confinement about 13th June 1959 She had already been examined by another obstetrician before she came to me and diagnosed both clinically and radiologically as a case of twin pregnancy

She was married three years ago and had one full-term normal delivery one and a half years ago a son alive and well There was no history of multiple pregnancy in the family on either side

On examination the patient was fairly well developed and well nourished The abdomen was unduly enlarged and two heads were palpable one at the brim and the other in the right flank B P 120/70 Urine—N.A.D Oedema of the feet

Blood Group B III Rh Positive

The X-ray which she had brought with her (Fig 1) showed two foetuses the first presenting by vertex with the back on the left side and the second transversely with the head on the right side

The patient was put on salt free diet and Diamox tablets and the oedema disappeared in a few days

The patient was admitted to the hospital on 30 5-1959 at 9 A.M with leaking membranes and mild pains

10 A.M The cervix was 2 fingers dilated

1 P.M Pains good and the head of the 1st foetus was engaged in the pelvis

5 P.M The cervix was fully dilated and the head was seen distending the perineum with pains

The head crowned soon afterwards and was delivered with some difficulty by pushing the perineum over the face

At this stage further progress stopped and the head was stuck at the vulva with

presentation A provisional diagnosis of Xiphipagus conjoint twins was made Deeper examination revealed thoracopagus union Operative interference was unavoidable Cutting the bridge which included liver and heart along with decapitation completed the delivery

The twins presented a face to face union, in lower part of thorax and epigastrium The hearts were united externally over the ventricles only In the heart of the left foetus, persistent sinu-atrial chamber and left superior vena cava, interventricular septal defect and dextroposition of vessels were noticed Lungs showed presence of accessory lobes The two livers were united along their right lateral surfaces Extrahepatic biliary apparatuses were fully developed in both the foetuses Polycystic kidneys and persistent Meckel's diverticula were observed in both the cases A single umbilical cord, with four umbilical arteries and one umbilical vein, was present On the basis of the anatomical findings, it has been suggested that in this case, fusion, rather than incomplete separation of monozygotic monoamniotic twins, is responsible for the genesis of this anomaly

References

1 Aird Ian B M J , 1, 831, 1954
2 Coulton D , Hertig A T , and Long W N Am J Obst & Gyn , 54, 119, 1947
3 Crew F A E M S University of Baroda Extension Lecture, 1960
4 Potter E L Pathology of the Foetus and New Born, Chicago, 1952
5 Quigley J K Am J Obst & Gyn , 29, 354, 1935
6 Tafeen C H , Freedman H L and Kahane A J Am J Obst & Gyn , 79, 1078, 1960

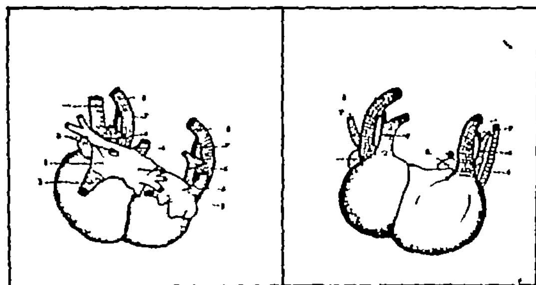


Fig 1
Posterior and anterior aspects of the heart of conjoint twins
1 Sinu-atrial chamber 2 Pulmonary veins 3 Inferior vena cava 4 Superior vena cava 5 Aorta 6 Pulmonary trunk 7 Ductus arteriosus 8 Auricular appendix

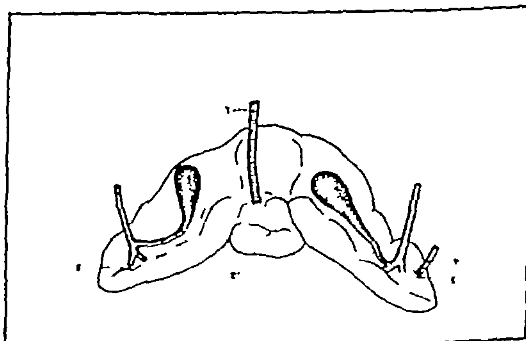


Fig 2
Anteroinferior aspect of the livers of conjoint twins
1 Umbilical vein 2 Tongue like process 3 Porta Hepatis 4 Inferior vena cava



Fig 1

no further X-rays were taken, the fourth one cannot be verified But as one foetus was vertical and the other transverse, a thoracopagus could not have been suspected On reviewing the literature there is no case reported with the radiological appearance as shown in this case As a matter of fact such an appearance would go against the possibility of a thoracopagus

Graber E A (1945) has reported a case of thoracopagus twins where the antepartum diagnosis was missed and retrospectively it was thought that the diagnosis could have been made by a proper study of X-ray films and the possibility of a thoracopagus considered The diagnosis would certainly be made more often if the possibility of conjoined twins is kept in mind in all cases of twin pregnancy

Moreover, if the condition is not thought of and the diagnosis not made when the labour is arrested due to obstruction, disastrous results might follow because of forcible methods that may be employed to complete the delivery

As regards the mode of delivery, three methods are suggested —

1 Synchronous delivery in parallel
2 Caesarean section
3 Intra-uterine separation and delivery

Synchronous delivery in parallel is possible only if both the foetuses are presenting by breech As Munro Kerr mentions, "This is done by traction on all the four limbs, carrying the bodies well forwards over the symphysis pubis, with the result that the posterior head gets engaged in the pelvis and is born, followed by the anterior head But this type of delivery is not possible unless the twins are premature and small in size In the present case it was out of the question

With regard to caesarean section, Graber E A (1945) states, "I do not believe caesarean section is warranted even if the diagnosis is made If the union is merely of skin attachment there will be sufficient elasticity to allow the babies to deliver spontaneously If the attachment is deeper other anomalies are probably present"

In the present case and those reported by Graber E A. (1945) Dwyer P J & Ripuran H A. (1959) and Foster P M (1948) the cardiac anomaly described is somewhat similar and inconsistent with separate existence of the twins Therefore caesarean section only for the

the chin pressing firmly on the perineum The baby did not make any attempt to breathe Arrest of the shoulder was thought of, and a hand was passed anteriorly but the anterior shoulder could be palpated within the pelvic cavity

Twin locking was also considered unlikely because the shoulders of the first foetus could be palpated below the second foetus Contraction ring dystocia was also excluded because no contraction ring could be palpated as far as the hand could reach

For the first time at this stage the possibility of conjoined twins was thought of and by passing the hand along the ventral aspect of the foetus the upper part of the junction was palpated Thus the diagnosis of conjoined twins was established By this time it was 5-30 P M and it was obvious that the first foetus was dead An attempt to auscultate the foetal heart was not successful

The question of the mode of delivery of the monster was then considered and it was decided to deliver the monster vaginally after intrauterine separation as far as possible Preparations for a laparotomy were also made and blood was ordered for transfusion in case it was necessary

At 6-15 P M the patient was given endotracheal anaesthesia and put in the lithotomy position An assistant was asked to maintain fundal pressure By pulling the head down firmly with one hand, and passing the other hand inside, the junction was palpated and a big pair of scissors was passed along the hand The junction, which consisted of soft parts and cartilaginous portion of the ribs, was progressively cut as it was brought down by pulling on the head of the first foetus

As the monster was almost full-term and therefore quite big in size, there was very little space to work in but gradually it was possible to separate the twins entirely The first foetus was born after cutting the last remnants of the junction below the xiphisternum and the second one was delivered by doing an internal version and breech extraction

The single placenta which separated quickly could be delivered without difficult A hand was then passed inside and the uterus was explored but no injury to the uterine wall was detected The uterus contracted firmly on giving intravenous ergometrine The patient subsequently made an uneventful recovery

The combined weight of the monster was 10 lbs 6 ozs A detailed anatomical study of the monster was not possible because the dead babies had to be handed over to the relatives for the last rites The thoracic viscera were, however, examined and it was found that there was a single heart from which the blood vessels of both the babies arose

Discussion

The problem of antenatal diagnosis of this condition is important because, the question as to whether the conjoined twins should be delivered vaginally or abdominally can be decided beforehand, and the obstetrician is not obliged to make a difficult decision on the spur of the moment as happened in this case

Secondly, with the advance in surgery, cases are reported where the twins, if they are born alive, can be separated surgically and continue to live as separate individuals provided all the essential organs are separate

The criteria on which the radiological diagnosis of a thoracopagus should be based are described by Gray, Nix and Wallace (1950) as follows —

1 The heads are at the same level and plane

2 *There is unusual backward flexion of the spines*

3 There is unusual proximity of the spines

4 There is no change in the relative positions after movement, manipulation and time

On studying the X-ray plate (Fig 1) it will be obvious that the first three criteria are absent and as

A BRIEF REVIEW OF DOUBLE MONSTERS WITH DESCRIPTION OF TWO CASES OF THORACOPHAGUS

by

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and
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Introduction

In all branches of the medical profession one comes across the routine cases which do not arouse interest, and are managed in a stereotype way, with a slight variation here and there But there are also the cases which occur rarely and only a few get the chance to manage one These are the cases that maintain the charm of medical practice In an obstetrician's practice, delivering conjoined twins is one such example

Definition, Classification, Incidence

Because of the difficulty or, more rightly, the impossibility to distinguish between a duplication of one or more limbs from a double monster, Schwalbe defines a double monster as one with at least some doubling of the body axis

If the foetal bodies of both the babies are completely developed it is described as duplicatus completus while others would be duplicatus incompletus The two babies may further be equal or unequal in size

According to the region of union, various forms of symmetrical double monsters are described, namely pygopagus, ischiopagus, dicephalus, diprosopus, craniopagus, cephalo-thoracopagus, dipygus, thoracophagus, rachipagus

Thoracophagus was the commonest occurring variety of the 110 cases of double monsters collected by Taruffi Seventy-one were cases of thoracophagus In these cases of double monsters the sex incidence as calculated by Forster is in the proportion of females to males as about 3 to 1

As regards the embryonic development of double monsters there is no controversial view to the fact that they arise from a single ovum as there is always a single placenta a single chorion and the same sex But it is still a question whether these malformations arise from the union (fusion theory) or the division (fission theory) of the embryonic rudiments

Obstetrical Importance of Double Monsters

Double monsters possess a very marked obstetrical interest It is evident that the increase in size may

sake of survival of the conjoined twins would not be justifiable It may be done if vaginal delivery is fraught with danger to the mother In the present case, the twins were already dead by the time the diagnosis was made and, if a caesarean was to be done, it would have been extremely difficult to pull the head up when it was already outside the vulva Under these circumstances if one is forced to do a caesarean section because of failure to deliver vaginally, it would be necessary to separate the head by decapitation first, remove it and then deliver the twins per abdomen

The third method, intrauterine separation and delivery, according to Smellie, "is right in theory but seldom possible in practice"

Munro Kerr also says, "Without doubt, caesarean section should be employed if the foetuses are large" In the present case, although the pregnancy was only 13 days premature according to calculation, and the combined weight of the twins was more than 10 lbs, it was possible to effect an intrauterine separation of the twins and deliver them It is therefore suggested that an attempt should be made to deliver the thoracopagus by intrauterine separation and abdominal delivery should be considered only if one fails to deliver per vaginam

Summary

1 A case of thoracopagus conjoined twins, with intrauterine separation and vaginal delivery, is described

2 Antepartum diagnosis by X-ray films is discussed, with the unusual lie of the twins

3 Methods of delivery are discussed

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1 Dwyer P J, Ripman H A Jour Obst & Gyn, B E, 66, 437, 1959
2 Foster P M Amer Jour of Obst & Gyn, 56, 799, 1948
3 Graber E A Amer Jour of Obst & Gyn, 49, 276, 1945
4 Gray C M, Nix H G and Wallace A J Radiology, 54, 398, 1950
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Puerperium uneventful
Weight of thoracophagus 7 lbs 12 ozs

Discussion

There was difficulty in extracting the foetus because traction was only made on the two feet that were brought down after the internal podalic version If the other two feet were also brought down, the lie would have been completely longitudinal and there should have been no difficulty in the extraction Under anaesthesia uterine pains were also weak No sooner the general anaesthesia was stopped, the uterine pains returned and were strong With the aid of good uterine pains nature helped in the delivery of the thoracophagus

Case 2 On 6-3-1959 at 5 a m a second gravida was admitted at full term for confinement

On examination fundal height corresponded to full-term pregnancy One head was well engaged and another hard mass was felt in the umbilical region which was not freely ballottable Two bodies could not be demarcated The foetal heart sounds were heard over a wide area in the suprapubic region and the rate was constant all over From these findings twins were suspected On internal examination the cervix was found to be taken up and os could admit one finger Membranes were intact and it was a vertex presentation The lower pole of the vertex had reached upto the level of the spines

At 1-40 p m the membranes ruptured the head was born as face to pubes and remained as such not undergoing the movement of external rotation Traction was made on the head without any success An attempt was next made to hook out the shoulders The shoulders could not be extracted and hence it was decided to put the patient under anaesthesia and try extraction At this stage it was suspected to be a case of conjoined twins Under anaesthesia a vaginal examination was made and it was found that there were more than two arms and the babies were joined in the region of the thorax. The second head was found to be in the right iliac fossa not separated from the trunk of the first baby The feet were on the left side near the fundus By this time the foetal heart sounds were absent A decapitation was done for the first head with sharp scissors and then the whole hand was introduced inside the uterus and two legs were brought down The other two legs were also caught and brought out so that the axis of the child was longitudinal The second head was pushed up to the fundus and the body extracted quite easily by traction on the feet The placenta was expelled and the uterus explored and found intact

Puerperium was uneventful Weight of the babies 8 lbs 2 ozs

Anatomical Description of Case 2

External appearance

(1) Both the foetuses were premature females both together weighing 8 lbs 2 ozs

(2) Two separate heads with the normal quantity of hair The head that presented first had hare lip and cleft palate the second one being normal

(3) The twins were joined completely in the thoracic region and by the upper parts of the abdomen

(4) One umbilical cord running from the centre of the arch formed by the junction of the two abdominal walls to the placenta

(5) There were two separate pelves each containing the normal female genital organs and having a normal patent anus

(6) Four hands of almost equal length normally developed with five fingers on each hand

(7) Three nipples

(a) One at the junction of the right side of one foetus with the left side of the other

(b) The other two situated normally one on the left side of one foetus and another on the right side of the other foetus

(8) Four legs of almost equal length normally developed with five toes on each foot

(9) One placenta with one cord attached

render the passage of the monster through the pelvis very difficult indeed, and in certain circumstances even impossible If diagnosis is not made, rupture of the uterus is likely as a result of obstructed labour or it may take place during internal manipulations This is to a certain extent prevented as the foetuses are small and premature or macerated and mostly present by pelvic presentation. Because of the rarity of such malformations no one obstetrician can have any large experience of this subject Such labours take place usually as a surprise, and their course depends rather on the obstetrical dexterity, if not so much on the obstetrical knowledge of the obstetrician concerned In many cases an external diagnosis of twin pregnancy has been made According to G Veit (who has given the best description of double monsters from an obstetrical point of view), such a malformation may be excluded with certainty, when two separate amniotic sacs can be recognized, or when a portion of the child lying uncovered can be felt near another part still covered by the membranes If the first child in a twin pregnancy presents as a transverse lie, a double monster should be thought of, since a transverse lie of the first twin is very uncommon If both heads in a twin case happen to lie at the same level, a double monster may be suspected.

The delivery of double monsters in a relatively large number of cases is accomplished by the natural forces, as a result of this it is often possible to observe in such cases a definite mechanism of labour The recognition of this fact is very important in the treatment of such cases

Case Reports

Case I—Mrs L, aged 24 years, para III was attending the ante-natal department regularly She had two full-term deliveries Last delivery was 2 years ago

This time, when she was 6 months pregnant, she was admitted in the hospital and treated for malaria At that time nothing abnormal was detected The foetal parts were felt and the foetal heart sounds were heard On 28-4-50, the patient came to the O P D with the complaint that foetal movements had stopped since a few days and she wanted to know whether the child was alive At that time she was about 8½ months pregnant The presentation was vertex, position could not be made out Head was soft and floating Foetal heart sounds were absent That same night the patient came with labour pains Head was engaged and soft Foetal heart sounds were absent and foetal parts not felt properly

Diagnosis Macerated foetus

Soon after admission the scalp was seen and a part of the head born which was soft and macerated The whole head came out except the chin which was brought out with great difficulty The shoulders could not be extracted The patient was given general anaesthesia and the posterior arm was hooked out The anterior arm was taken out and then a third arm was seen no sooner the anterior arm came out A vaginal examination was made and it was found that there was another head on the right side but smaller than the first This head was not separate from the first foetus It was attached to the same body The first head was cut off from the body Being a macerated child this was easily achieved with the scissors Internal podalic version was done and a foot was brought down The second foot was also brought down and traction was made on the feet There was no progress so the anaesthesia was stopped and it was decided to take an x-ray In the meantime the patient was getting fairly good pains and the foetus was advancing With a few strong pains the body was pushed out and finally the second head came out It was a thoracopagus

(10) Genital system The sex in both cases was female A separate uterus with its tubes vagina and external genitals could be clearly made out

Comment

The process of fusion appears to have affected the entire region of septum transversum, cardiac tubes and a part of the midgut, and the cephalic part of the ventral body wall

Comment

Reports of two cases of thoracophagus with their obstetric management and also anatomical description of one of the conjoined twins has been presented A short review of double monsters is also given The weight of the babies in Case 1 was 7 lbs 12 ozs and 8 lbs 2 ozs in the second case. In the first case the babies were macerated and in the second case the foetal heart sounds were present At the birth of the head the first baby gave a few gasps In both cases the sex of the babies was female In both cases the first baby was presenting by the vertex. Both the cases were delivered vaginally by a similar method The experience gained by the senior author in 1950 while delivering the first case was of immense value at the time of the second case These cases are easily delivered by the pelvic presentation In both cases as the first head was delivered it was necessary to decapitate this head and then to do an internal podalic version and bring down the feet In the first case, as the condition was not diagnosed, only two feet were brought down and hence there was no progress It was only after the anaesthesia was stopped that powerful uterine contractions appeared and nature helped in the delivery of the foetuses This difficulty was kept in mind during delivery of Case 2 and hence there was hardly any difficulty at that time

Two cases of thoracophagus have been reported in the Indian literature by Misra from Calcutta In one case caesarean section was done, the weight of the babies being 11 lbs In the other case the weight of the babies was 7 lbs and an embryotomy was done

Summary

(1) A brief review of double monsters is given

(2) Two cases of thoracophagus have been described with anatomical description of one case

Acknowledgment

We are grateful to Dr K N Dastur, M S , F R.C S , Honorary Surgeon, B Y L Nair Hospital, Bombay, for dissection of Case No 2 and Dr (Miss) M Bakhtiary for the anatomical description

Our thanks are due to Dr K M Masani, M.D (Lond), F R C S , (Eng), Honorary Obstetrician and Honorary Principal Medical Officer, Nowrosjee Wadia Maternity Hospital, Bombay, for his kind permission to publish this work

References

1 Birnbaum R. Malformations and Congenital Diseases of the Foetus J & A Churchill London, 1912

almost to the centre of the placenta One amniotic sac with one chorion, there being no partitioning in the sac

Description of the Viscera Thoracic and abdominal cavity

(1) Lungs Each foetus had two pleural sacs and two lungs

(2) Pericardial cavity One cavity common to the two foetuses

(3) Heart (a) Two chambers, each representing the ventricles of either foetus, but there was no partitioning of these chamber into the right and left ventricles The walls of these two chambers were fused but the cavities separate

(b) One large chamber representing the atria of both the foetuses so that there was neither partitioning into separate chambers for either foetus nor into the right and left atrium

(c) Separate superior and inferior venae cavae for each foetus

(d) Separate aortae and pulmonary trunks for each foetus

(e) Separate pulmonary veins for each foetus, opening into the common atrial chamber

(4) Diaphragm Two cupolae for each foetus, fused ventrally in the region of the central tendon

(5) Liver A symmetrical mass, with only one gall bladder, shared by both the foetuses

(6) Spleen One for each foetus

(7) Pancreas One for each foetus

(8) Digestive tract Each foetus had its own complete digestive tract, with the following peculiarity —

About an inch beyond the stomach there occurred a fusion of the two small intestines into a common tube, and separation took place a few inches proximal to the respective coeca and appendices, indicating that a part of the embryonic midgut was involved in this fusion and was common to both the foetuses

(9) Urinary system A pair of kidneys and ureters and a separate urinary bladder for each foetus Correspondingly there were two large suprarenals in each foetus



Fig 1

[illegible] of case No 2



Fig 2

Skiagram of conjoined twins of case No 2

PRIMARY CARCINOMA OF THE FALLOPIAN TUBE

by

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Primary carcinoma of the fallopian tube is a comparatively rare tumour When present it creates a difficult diagnostic problem, and an unsatisfactory therapeutic situation

The incidence of primary carcinoma of the fallopian tube among genital tract cancers reported by various authors ranges from 0 16 to 1 16 per cent The lack of characteristic history, physical findings, and the frequent association of other pelvic conditions like multiple myomas, endometriosis, adenomyosis and benign ovarian cysts make the clinical recognition of the condition almost impossible The prognosis of these cases is thus poor because of the difficulty in early diagnosis Various workers have laid great emphasis on the preoperative vaginal cytological examination as a contributory factor in the diagnosis of tubal malignancy

The rarity of primary carcinoma of the fallopian tube and the infrequent clinical recognition of the same justify recording the clinicopathological findings of even a single case Our case fully justified the criteria established for the diagnosis of primary carcinoma of the fallopian tube

Case Report A 35 years old Hindu housewife was admitted to the Sarojini Naidu Hospital Agra on May 26 1958 She complained of (1) amenorrhoea since 3 months (2) bleeding per vaginam off and on since 1 month (3) painful lump on the left side of the abdomen since 15 days and (4) pain in the lower abdomen since 1 month

Menstrual history Menarche at 14 years menstrual cycle 4 5/28-30 days Last menstrual period—3 months back Obstetric history married 12 years back No full-term normal delivery Had four abortions of two to three months duration Last abortion eight months back Past history non contributory Physical examination revealed a middle aged woman blood pressure 110/70 mm. of Hg Systemic examination was normal Pelvic examination cervix backwards and hypertrophied Uterus anteverted and bulky felt separate from a mass in the left and posterior fornix Fornices—a firm tender mass felt in the left and posterior fornices size about 2½" x 3 margins not well defined Laboratory investigations consisted of complete blood picture and urinalysis which were essentially normal.

The preoperative diagnosis was ectopic gestation with tubo ovarian mass At operation a bilateral salpingectomy myomectomy and removal of a broad ligament cyst was done A more radical operative procedure was not carried out firstly because at this stage malignancy was not suspected and secondly the blood pressure of the patient came down considerably The post operative course was afebrile and uncomplicated for seven days Patient refused any further treatment

Gross Pathology The specimen received

2 Forster Quoted by Birnbaum, p 304
3 Misra S. J Obst and Gyn India, 7, 214, 1957
4 Potter E L Pathology of the Foetus and Newborn The Year Book Publishers Inc, Chicago, 1953
5 Schwalbe Quoted by Birnbaum, 301
6 Taruffi Quoted by Birnbaum, 323
7 Veit G Quoted by Birnbaum, 301

ported in a middle-aged woman associated with uterine leiomyomata and broad ligament cyst

A brief review of literature on the subject, and the clinico pathological findings of a case are presented

References

1. Anspach B M Am J Obst & Gyn 20 511, 1930
2. Brewer J I Guderian A M Obst & Gyn 8 664 1956
3. Corscaden J A Gynaecological Cancer p 294 Thomas Nelson & Son New York 1951
4. Curtis A H Obstetrics and Gynaecology Vol II p 1012 W B Saunders Company Philadelphia 1933
5. Finn I A West Jr Surg 56 334 1948
6. Fidler H K and Lock D R Am J Obst & Gyn 67 1103 1954
7. Finn F W and Javert C T Cancer 2 803 1949
8. Frankel A N Am J Obst & Gyn 72 131 19
9. Fullerton W D Am J Obst & Gyn 48 467 1940
10. Hayden G E and Potter E L Am J Obst & Gyn 79 24 1960
11. Hu C Y Taymor M L and Hertig A T Am J Obst & Gyn 59 58 1950
12. Johnson V O Am J Obst & Gyn 61 688 1951
13. Liepchitz F Quoted from Ref 11
14. Lofgren K A and Dockerty M B Surg Gyn & Obst 82 1946
15. Lofgren K A Surg Gyn & Obst 82 199 1946
16. Mitchell R M and Mitchell R W Am J Obst & Gyn 50 1945
17. Reddy D J Gupta and Reddy S J J Med Assoc 20 1957
18. Sanger M and Barth Quoted from Ref 11
19. Stern B D and H Am J Obst & Gyn 517
20. C H Quoted from Ref
21. Weekes L J and Whitten Am J & Gyn
22. Wh and Arch Surg 19

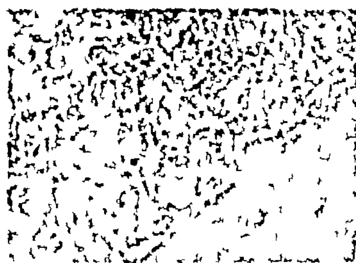


Fig 1

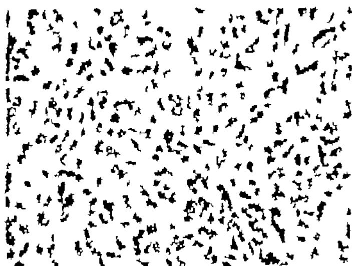


Fig 2

consisted of both the fallopian tubes, two fibroids along with a cyst from the broad ligament The left fallopian tube was retort-shaped and moderately enlarged measuring 10 x 6 x 2.5 cm The external surface was greyish pink and smooth On cutting through about 10 cc of blood-stained purulent material came out The lumen of the tube was occupied by a friable, granular, greyish tumour mass The thickness of the wall of the tube varied from 0.2 to 0.4 cm

The broad ligament cyst removed measured 8 x 6 x 3.5 cms External surface was smooth and translucent In cutting open the cyst, 40 cc of serous fluid came out It was a unilocular cyst with a smooth internal lining Histologically, the broad ligament cyst was a simple serous cyst lined by columnar epithelium

Microscopic findings The tumour mass in the left fallopian tube presented a papillary-alveolar type of growth pattern (Fig 1) At areas there is early glandular formation and invasion of the tubal wall The individual cells are undifferentiated at places with moderate number of abnormal mitotic figures (Fig 2) while at others they are fairly well differentiated columnar shaped with scanty mitotic figures The uninvolved portions of the left and the right fallopian tubes show evidence of chronic salpingitis

Comments

Primary carcinoma of the fallopian tube is a rare entity which almost always eludes a preoperative and often an operative diagnosis as happened in this case too The signs and symptoms of primary carcinoma of the fallopian tube are obscure and indefinite in the early and even in the advanced stages of the disease Nevertheless a common triad frequently encountered, although not diagnostic is the association of (1) bloody or serosanguinous vaginal discharge, sometimes with episodes of massive haemorrhage, (2) lower abdominal pain and (3) the presence of a pelvic mass This patient had all these presenting features Hydrops tubae profluens considered by some as a characteristic feature and refuted by others was not present in this case

Some workers have mentioned the frequent association of sterility with primary carcinoma of the fallopian tube This patient was however a fourth gravida

An unilateral involvement of the fallopian tube, as in this patient is much commoner as compared to bilateral affection The finding of blood-stained purulent material in the involved fallopian tube as in this case has also been reported by Hu et al Numerous microscopic classifications of the primary carcinoma of the fallopian tube have been put forward by various authors The present case belonged to Grade II, i.e. papillary-alveolar type of Hu et al's classification

A correlation of the histological grading with the prognosis cannot be ascertained in this case, as no follow-up was available

Chronic salpingitis has been suggested as a predisposing factor by some, while it is disputed by others, as being a causative factor in the production of primary carcinoma of the fallopian tube We found evidence of chronic salpingitis both in the uninvolved portion of the left tube as well as in the contralateral fallopian tube The exact significance of this is still a matter of dispute

Summary

A case of unilateral primary carcinoma of the fallopian tube is re

in the same subject remnants of old trophoblastic tissue turn malignant yet the trophoblast of the later pregnancy remains within bounds

Author came across one such interesting case of chorionepithelioma associated with normal pregnancy. It was therefore considered proper to report the case

On looking up the records of the K R Hospital (where author is working) from April 1951 to April 1960 author found reports of 5 cases of diagnosed chorionepithelioma and another 5 cases in which though the histological report of the curretting was very suggestive of this condition no definite diagnosis could be done as the cases did not turn up for further investigations

Out of the 5 cases, three followed hydatidiform mole one normal pregnancy and one followed abortion. The case reported here had a hydatidiform mole before the epithelioma

Case Report

The patient a young Muslim L.K. 23 years of age was admitted to the maternity ward of the K. R. Hospital on 19.9.1959 with three months amenorrhoea and bleeding per vaginam for 2 months

Past History: On looking up her old record it was found that in ... she had been admitted to the hospital with 11 weeks amenorrhoea and bleeding per vaginam for 4 days and ... to be a case of hydatidiform mole. The mole was evacuated per vaginam and she was discharged. [illegible]

[illegible]

... the past history ... histography of old ... showed focal ... She was discharged.

The patient came ... on 10th Jan ... pregnancy and slight bleeding ... showed uterus of ... pregnancy. Foetal parts ... L.O.A. position ... could be heard.

Speculum examination ... abnormality ...

Clinical diagnosis ... placenta ... patient on conservative treatment ...

On the ... day ... suddenly started ... material ... urine and faeces ... [illegible]

[illegible]

AN INTERESTING CASE OF CHORIONEPITHELIOMA ASSOCIATED WITH NORMAL PREGNANCY

by

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Introduction

Chorionepithelioma is a very rare condition, even more uncommon than hydatidiform mole which, as Novak & Novak mention, occurs once in every 2500 pregnancies

The invasive character of the trophoblast is indeed physiological though in normal pregnancy certain local and systemic defensive mechanisms keep its invasion into the uterine musculature and blood vessels within limits and do not permit the occasional emboli of the trophoblast from gaining a foothold anywhere else in the body It is indeed surprising why such defence mechanisms break up so rarely that the condition of chorionepithelioma is so uncommon

The distinguishing feature of chorionepithelioma is the invasion of the uterine musculature as also the blood channels by trophoblastic cells advancing in bulk, with destruction of the uterine tissues accompanied by coagulation necrosis and haemorrhage Usually, little or no evidence of original villous pattern is detectable histologically though their presence does not exclude chorionepithelioma

Metastases are common and are quite often responsible for drawing attention of the clinician to the existence of this condition In the manner of spread to other organs this condition resembles sarcoma rather than carcinoma, in that it is chiefly by vascular invasion Retrograde transport and occurrence of metastases in the vagina and even vulva are quite frequent Novak estimates vaginal metastases occurring in about 50% of cases Novak and Novak report that this condition is preceded by hydatidiform mole in 40% of cases, by abortion in another 40% and by normal pregnancy in 20% of all cases Payne states that the interval between pregnancy and the disease varies from 6 days to 5½ years and that in 91% of cases it is less than 12 months Adair mentions that authentic cases have been reported upto 10 years after pregnancy Hertig finds from study of 200 hydatidiform moles that 2 5% of these are followed by metastasizing chorionepithelioma The tumour usually arises at the placental site but may also arise from the invasive areas in the uterus or other organs

Normal pregnancy occurring concomitant with chorionepithelioma is a very rare and interesting condition. It is indeed remarkable that whereas

central Skiagraphy of the skull showed no abnormality

On 17th February 1959 she was transferred to gynaecology ward Total hysterectomy was done under local anaesthesia At the operation the uterus was found to be of the size of 10 weeks' pregnancy and irregularly enlarged at the fundus On opening the uterus a purplish irregular growth, about 1″ x 2″, was seen on the left side of the fundus

Right ovary was cystic and congested Left ovary was also congested

Vaginal growth receded after operation but the patient did not regain full conciousness She ran temperature up to 102°F and gradually deteriorated and finally expired on 2nd May 1959

Discussion

As already mentioned in the introductory remarks, chrionepithelioma is a rare condition and its association with a normal pregnancy is rarer still Walthard (1907) reported such a case in which pregnancy was associated with chorionepitheliomatous vaginal nodules and although hysterectomy failed to reveal any chorionepithelioma of the uterus or placenta, the patient died 3 or 4 years later of chorionepitheliomatous metastases in lungs, liver and kidneys Fickentscher (1941) reported a case of chrionepithelioma associated with pregnancy and cited a few others of a similar type Cordua (1949) reported one case and so also Mathieu (1939), Dafoe (1939) described a case of chorionepithelioma occurring during an ectopic pregnancy Mac Rae (1951) described one case of this disease associated with pregnancy In this case the baby was alive and well a year later though the patient expired

In Mac Rae's case there was no history of abortion miscarriage or hydatidiform mole The patient had had 3 normal pregnancies previously

In Mac Rae's case the placenta of the child born alive was found to have a small yellowish excrescence on its surface which proved to be the primary chorionepitheliomatous growth On the placental site in the uterus there was a raised area of about 3 cm in diameter later shown to contain chorionepitheliomatous cells In the case reported here, however, the placenta was normal in appearance Its histopathological examination was, however, not carried out

In the present case it appears that the chrionepithelioma followed the hydatidiform mole which occurred in 1957 and that the normal pregnancy occurred in the presence of this condition It is, however, remarkable that the placenta of the foetus did not show any macroscopic evidence of chorinepitheliomatous involvement Perhaps the normal trophoblast could not break up the local defensive maternal barrier which the hydropic cells of the old hydatidiform mole turned malignant could

Summary

A case of chorionepithelioma of the uterus with metastatic secondaries in vagina, lungs and central nervous system accompanying a normal pregnancy, has been reported The patient had had hydatidiform mole about 14 months previous to the pregnancy The foetus was delivered alive though premature The foetal placenta showed no macroscopic evidence of chorionepitheliomatous involvement

ma of the interstitial cells of the endo metrium (*Fig 1*)

On the basis of this report a radical Wertheim s hysterectomy was done

The report on the specimen removed was as follows

Gross Description The specimen consists of the uterus measuring 7 5 x 5 cms the ovaries measuring 2 5 cms x 2 cms each the oviducts measuring 5 cms in length on either side and the parametrial tissues The ovaries and tubes appear normal, the uterus is bulky but soft and spongy

On dividing the anterior wall of the uterus longitudinally a soft encephaloid growth measuring 6 x 4 cms is seen arising from the endometrium of the posterior wall near the fundus of the uterus The mass is sessile and friable The endometrium surrounding the base of the tumor shows no evidence of infiltration except over a minute area at the superior angle 1 5 cms to the left of the tumor base is a small mucous cyst

The serous coat of the uterus is smooth shiny and does not show any involvement by the disease

Bisection of the posterior wall reveals no involvement of the myometrium macroscopically either

Microscopic Report

Section from tumor The section from the tumor is identical with that of the uterine curettings reported on pre operatively — Endometrial Sarcoma (Figs 2 3)

Section from endometrium at tumor base presents indubitable adenocarcinoma —Broder s Grade IV (Figs 4 5)

Section from endometrium elsewhere Endometrial hyperplasia no evidence of malignancy

Section from myometrium No malignant invasion of the myometrium seen

Commentary

Reports in literature of sarcomatous tumors of the endometrium are rare There are passing references to it in text-books Boyd (1947) describes endometrial sarcoma as follows



Fig 1
Low power of biopsy



Fig 2
Low power of tumour



Fig 3
High power of tumour

REPORT OF A CASE OF "SO CALLED ENDOMETRIAL SARCOMA"

by

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and

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Introduction

The paper reports a case what was apparently, on histological examination of endometrial curetting and of the main tumor mass, a sarcoma arising from the endometrial stromal cells but which on serial sectioning revealed an Adeno-carcinoma The authors in reviewing literature doubt whether all the refinements of classification of endometrial sarcoma, endometrial carcinoma or carcino-sarcoma have any real basis in fact, as the tumors arising from either glandular epithelium or the stromal cells are biologically and embryologically identical, and whether they do not really represent varying degrees of differentiation of a malignant tumor which could be more accurately called "Malignant Endometrioma"

Clinical Findings

Mrs R R Age 62 years Female
Upper middle class Hindu Tamil (Madras City)

presented with a history of blood stained vaginal discharge of a month's duration and vague pains in the lower abdominal region especially in the hypogastrium

Patient had reached the menopause 12 years ago There had been no disturbances of menstruation during the active reproductive phase of her life She was married in her [illegible] year, [illegible] multipara had 9 children of whom only two were not surviving Last child was born 32 years ago Patient had suffered two abortions

The patient was an obese lady, hypertensive and diabetic, but well preserved

Examination revealed a smooth and undiseased cervix and vagina The uterus was retroverted and slightly bulky but freely mobile Adnexa were clear

No abnormality was detected in any other system

Investigations Routine investigations were carried out There was no significant alteration from the normal in either the blood counts or in the blood and urine chemistry except that the glucose tolerance test confirmed diabetes

Tissue Diagnosis

Vaginal smear Malignant epithelial cells are present

Cervical biopsy Normal cervical mucosa was reported

Endometrial Curettings *Section* presents endometrium in which the stromal cells appear large, anaplastic, with poorl defined cell outlines, large nuclei marked increase in nuclear-cystoplasmic ratio numerous mitotic figures and great vacuolation of cytoplasm A few acini are engulfed in the tissue Though the epithelial cells of the acini are hyperplastic, they do not appear malignant In some places the malignant stromal cells show a regimentation of the nuclei with arrangement of the cells in sweeping bundles The tumor is very vascular but there is no malignant invasion of the blood vessels

Reading The picture is that of a sarco-



Fig 4
Low power of section at tumour base

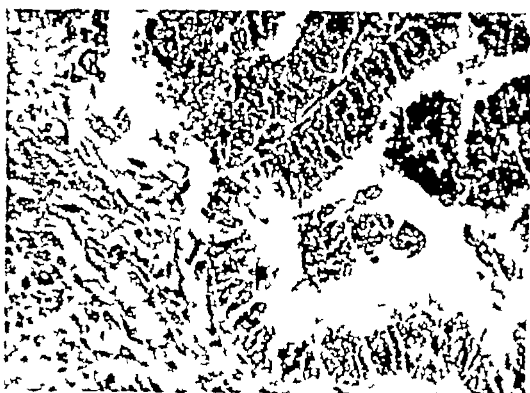


Fig 5
High power of section at tumour base

"Endometrial sarcoma is usually circumscribed but may be diffuse It originates in the fundus, and often forms a polypoid bulky mass in which necrosis may occur as well as cystic areas of haemorrhage Microscopically, it consists of a mixture of fusiform and large spheroidal cells "

The microphotograph of the section from the tumor proper as well as its gross appearance constitute a classical illustration of Dr Boyd's description The origin from the posterior uterine wall is also in line with the general predilection of these tumors

However, illustration 4 is the microphotograph of the section from the tumor base The picture is absolutely characteristic of adenocarcinoma

Symmonds et al (1955) classify malignant endometrial tumors into 1 Pure endometrial sarcomas 2 Mixed mesodermal tumors 3 Pure adenocarcinoma 4 Carcinosarcoma

In discussing carcino-sarcomas, they say that it is important to differentiate the true carcino-sarcoma from the sarcoma-carinoma collisions The latter they define as independent foci of carcinoma and sarcoma meeting accidentally in the course of their spread along the endometrium, but the former is an intimate mixture in the same area of origin of carcinomatous and sarcomatous elements

If we accept their definition the case under report would fall into the category of a carcino-sarcoma We, however, are of the opinion that a classification based purely on a histological picture is a "dead" one Histogenetic background and biological behaviour should, we feel, also be considered in such a classification

The utero-cervical canal is developed from a bilateral tubular invagination of the dorsal coelomic epithelium, which are called the Mullerian ducts They are of mesodermal derivation The lining cells of the Mullerian ducts differentiate to form both the glandular epithelium and the stromal cells, i e they are bipotential In the differentiation that is associated with an anaplastic malignant tumor of the endometrium, the distinction between the fully deve-

clinical practice is responsible for the change in the old teaching that trophic ulcers usually do not undergo a malignant change

Case I A Christian female aged 50 years was admitted in the gynaecological ward of the K.E.M Hospital Bombay on 8-10-1956 with the chief complaint of something coming down per vaginam for 10 years and foul smelling vaginal discharge for 2 years She was a fifth para and she had all normal hospital deliveries Her last delivery was 22 years ago meno pause for 5 years She had not used pessaries any time On examination she had procidentia She had four trophic ulcers two on the anterior vaginal wall and two on the antero-lateral vaginal wall The edges of the ulcers were everted with indurated base. The ulcers used to bleed on touch The length of the uterine canal was 2¼ inches The procidentia could be reduced Vaginal examination showed normal sized anteverted uterus with clear fornices Her haemoglobin was only 42% Her blood pressure was 110/70 mm Hg Urine examination showed a few pus cells Cystoscopy revealed nothing abnormal Biopsy from the ulcer showed changes of epidermoid carcinoma Patient was treated for anaemia and her general condition improved Two months after admission she was taken up for operation Mayo Ward hysterectomy with excision of vagina with trophic ulcer was done under spinal anaesthesia The ulcers were found to be superficial and the bladder was not involved Operative field was a little more vascular Patient had uneventful post operative period She had no wound infection or gaping of the wound She was discharged 3 weeks after operation She was given a full course of deep x-rays She developed a recurrence at the local site after 6 months and had foul discharge and backache She did not attend the hospital for this recurrence and died two years after the operation

Case 2 A Christian female aged 60 years was admitted in the gynaecological ward of the K.E.M Hospital on 12 10 1959 for procidentia of 5-6 years duration The procidentia could not be reduced She was menopausal for last 10 years She had two normal deliveries the last delivery was 25 years ago She had not used pessary any time On examination she had an irreducible procidentia with multiple trophic ulcers The ulcer on the anterior vaginal wall was about 2 inches in diameter and was very friable with everted edges and indurated base The length of uterine canal was 2 inches She also had a complete rectal prolapse. Her haemoglobin was 7 gm per cent Urine showed plenty of red blood cells and pus cells Her urea



Fig 1
Procidentia of 10 years standing The ulcer is seen on the antero lateral vaginal wall on the left side



Fig 2
Procidentia of 6 years duration The ulcer is seen on the right lateral vaginal wall There is also complete prolapse of the rectum

MALIGNANCY IN THE TROPHIC ULCER IN CASES OF PROCIDENTIA

by

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Introduction

It is uncommon for trophic ulcers in cases of procidentia to undergo a malignant change Trophic ulcers are not uncommon findings in cases of long standing procidentia However, only 100-110 cases have been reported in the English literature where a malignant change has occurred either in the cervix or in the trophic ulcer There are very few case reports from India Vartan could not find any reference to such a condition in British Journal of Obstetrics and Gynaecology till 1955 Delvaux (1931) wrote to 14 gynaecologists in England and 9 of them replied they had not seen cases of malignant change in procidentia Guthrie (1932) wrote to 48 American gynaecologists and 28 out of them replied they had not seen such a case Smith, Graves et al (1929) studied 683 cases of procidentia in Free Hospital for Women at Massachusetts between 1875 and 1928 and they found only one case of malignancy in a case of procidentia Smith et al further observed that it was the only case in that clinic seen by any of the staff members in their entire experience Stones et al (1955) after 25 years reported 10 case of malignancy in procidentia cases from the same hospital

Growing facilities for histopathological studies in most of the hospitals and recent advances in vaginal cytology for early diagnosis of cancer are responsible for detecting more cases of malignant change in procidentia cases As against greater facilities for cancer diagnosis, recent advances in anaethesia, blood transfusion and antibiotics have made surgeons bold and so age is no bar for surgical interference Cases of procidentia are not likely to remain for a long time without surgery and so the surgery is likely to be done before trophic ulcers have time to undergo a malignant change

We believe that we are likely to detect more cases of malignant change in procidentia if all long standing cases of procidentia are subjected to histopathological examination It is very necessary to make a diagnosis of malignant change in procidentia because the management will differ in cases of only procidentia and in cases of procidentia with a malignant change We venture to report two cases of trophic ulcers in procidentia undergoing malignancy Growing awareness of this entity in

nitrogen was 10 5 mg % On intravenous pyelography she had hydronephrosis both sides and no evidence of urinary radio-opaque calculus Cystoscopy revealed involvement of bladder mucosa with malignant growth Biopsy from the trophic ulcer showed changes of epidermoid carcinoma Perineal anterior exenteration, as described by Stanley Way (1958), was contemplated for palliation In the meantime she developed high fever, neck rigidity and expired within 3 weeks after admission

Discussion

Rocker (1958) found that majority of the cases of malignant change in procidentia were between 60 and 80 years of age and the procidentia was at least of 10 years' duration in 60% of cases Fobe (1955) reviewed the world literature on malignant change in procidentia and explained the rarity of malignant change in procidentia on the following basis

1 Drainage of secretions is more free in procidentia
2 Atrophy of vaginal and cervical epithelium
3 Vascular change with constant hyperaemia
4 Keratinization of prolapsed organ
5 Age of the patient usually above 60 years
6 Some patients may have been operated for cancer cervix before prolapse develops
7 Unknown constitutional factor

To the above list I may add that the patient may have been operated for procidentia before the trophic ulcers have time to develop malignant change Following points may be cited in favour of malignant change in a procidentia

(1) Constant friction of the procidentia with the thighs and clothes acts as a constant irritant stimulating the tissues to undergo a malignant change

(2) The use of pessary without proper care such as regular douches and frequent removal of the pessary to inspect the vaginal walls

(3) Decubitus ulcers, once they develop, infection is likely to take place if they are exposed to the outside surrounding Thus constant friction, chronic infection or irritation from pessary may act as a trigger in stimulating the tissues to undergo a malignant change

Summary

(1) Two cases of malignant change in a procidentia are reported

(2) Routine biopsy of trophic ulcers of long standing procidentia is suggested

(3) Relevant literature on the subject is reviewed

Acknowledgment

I am thankful to Dr K M Masani, M D , F R C S , Ex Honorary Gynaecologist, K E M Hospital and Dr V N Purandare, M D , F R C S , Honorary Gynaecologist K E M Hospital, Bombay, for allowing me to report the above cases I am also thankful to the Dean, K E M Hospital, for allowing me to use hospital records

Reference

1 Delvaux F Cited by 4
2 Fobe H and Thiery M Gynaecologia 139 329 346 1955

At 7 A.M., five hours after admission the pain was less she was more comfortable and the pulse had come down to 88 per minute and volume and tension was good

At 10-30 A M, eight and half hours after admission she complained of pain and giddiness She was very restless pulse rose to 120 per minute B.P taken at this time was 100/70 temperature was normal. There was marked pallor and air hunger Tongue was dry and pale Abdominal examination showed distension of lower abdomen and dullness in right flank. Shifting dullness was not present Vaginal examination under spinal anaesthesia revealed that cervix was pointing forwards uterus was retroverted mobile right fornix marked fullness and bulging was present Aspiration done through right fornix revealed altered blood confirming the diagnosis of ruptured ectopic gestation Immediate laparotomy showed that abdominal cavity was full of blood uterus was of normal size and both tubes and left ovary were normal Right ovary was normal sized but showed a small *haematoma* and a *rupture from which* profuse bleeding was going on. Other viscera were normal No other bleeding points were found Right oophorectomy was done abdominal cavity was cleared of blood and abdomen was closed in layers Endometrial biopsy was taken at the same time She was given 300 c c of compatible blood and two pints of plasmosan Post operative period was uneventful and she was discharged on 6-4-55 Vaginal examination this time showed normal sized retroverted uterus fornices were clear

Pathological Report on Specimen Macroscopic — the ovary was normal sized with area of blood clot in which no ovum or placental tissue was seen

Microscopic — ovary showed trophoblasts and chorionic villi with areas of haemorrhage and theca-lutein and paralutein cells and a fibrovascular zone confirming the diagnosis of ovarian pregnancy

Endometrium showed secretory phase at some places and post-menstrual phase at others no decidual cells seen.

Comments

Ovarian pregnancy is a rare entity According to Baden and Heines (1952), the cases reported are 100 More than 100 cases are reported in the literature of which half are authentic (Curtis 1951) Hertig (1951) gives the incidence of 1 07 of all ectopic pregnancies He found an incidence of 0 91 at the Free Hospital for Women, absolute incidence being 1 for 25,000 to 40 000 pregnancies In our hospital, of all the cases of ectopic pregnancies operated, this was the only case which turned out to be ovarian pregnancy in the last 5 years

This rarity is because of the fact that the ovum as it exists in the ovary is incapable of fertilization until it has undergone certain maturation changes which are completed during its passage in the tube (Novak 1958)

There are different views about the mechanism of ovarian pregnancy The escape of egg from the follicle might be retarded by tortuous channels of exit or after rupture of follicle the ovum might be retained in discus proligerous Two mature follicles might be superimposed, the deeper discharging its ovum into the cavity of the more superficial, bringing about the retardation which would permit fertilization (Leopld)

In recent years, Veit's views are accepted that the implantation is not necessarily within the follicle from which the growing ovum was discharged, especially now we know that the secretion of the corpus luteum is essential for implantation After discharge the ovum is fertilised and then takes root in the follicle or the corpus luteum (intrafollicular

OVARIAN PREGNANCY

(Case Report)

by

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The occurrence of ovarian pregnancy is rare but it is well recognised It presents interesting features and diagnostic difficulties Because of the rarity of the condition, the following case is reported

Case Report Mrs Y M , aged 20 yrs , Hindu female, was admitted to the Medical College Hospital, Nagpur, on 17-3-1955 at 2 a.m She complained of bleeding per vaginam for twelve days and pain in abdomen since one hour She had two months' amenorrhoea prior to this bleeding

Past Medical History Revealed nothing of significance

Menstrual History Menarche at the thirteenth year Menstrual cycles regular 3-4/30 days and painless Since one year the cycles were 5-6/25-30 days, profuse with premenstrual and menstrual pain Last menstrual period was two months and twelve days back and she was getting slight bleeding since twelve days

Obstetric History Patient was married five years back She had one full-term normal delivery three years back Puerperium was normal but the child died after forty-eight hours

Present History After two months' amenorrhoea, she started getting bleeding which was slight and fresh There was no pain with this bleeding She did not pass anything in these twelve days One hour prior to admission she got an attack of severe pain in the abdomen which was accompanied by giddiness and vomiting

Examination Findings She was a woman of average build, not anaemic She was comfortable Pulse was 100 per minute B P -120/80 Cardio-vascular and respiratory systems normal On abdominal palpation, liver and spleen were not felt There was diffuse tenderness felt in both iliac fossae No definite mass was palpable, no rigidity or muscle guarding was present On vaginal examination the cervix was pointing forwards, uterus was retroverted and its size could not be made out There was tenderness in both fornices but much more on the right side Speculum examination disclosed a healthy cervix and there was no bleeding from the uterine cavity

Investigations Temperature was normal Haemoglobin percentage was 10 8 gms Sahlie's Total W B C count was 9000 per cu mm Differential leucocytic count was, polymorphs 65 per cent, lymphocytes 33 per cent and eosinophils 2 per cent Blood was grouped and cross-matched, urine was normal

With the findings stated, the provisional diagnosis was 1) Ruptured ectopic gestation, and 2) Acute salpingitis Because of her good general condition and normal blood pressure she was observed during the night with the idea to examine her under anaesthesia and to do a diagnostic aspiration in the morning She was given phenobarbitone, one grain, and atropine sulphate, 1/100 grain, s c She was given injection of 4 lacs of procain penicillin Her pulse was recorded every fifteen minutes She was watched for any attack of pain and collapse

ovarian pregnancy The disturbance in this case occurred in the first trimester which has been noted in 75 5 per cent of cases (Baden and Heines 1952)

The other possibility of acute salpingitis was excluded by the normal blood picture and the normal temperature

The tube on the right side was not removed, as such the microscopic evidence of absence of pregnancy in the tube could not be obtained However, the tube was macroscopically quite normal

Summary

A case of ovarian pregnancy is presented Views regarding its origin are discussed and the criteria for the diagnosis are mentioned

Acknowledgment

My thanks are due to the Dean, Madical College and Hospital, Nagpur, for allowing me to publish this case I am extremely thankful to Dr P K Devi, Professor of Midwifery & Gynaecology, Medical College, Nagpur, for allowing me to report this case and to Dr R Anjaneyulu for his valuable guidance

References

1 Baden W F and Heines O H Am Jour Obst Gyn 64, 352 1952
2 Curtis Text book of Gynaecology by Curtis A H and Huffman J W 6th edit 608 1951
3 Eastman William s Obstetrics 11th edit 567, 1956
4 Greenhill J P Obstetrics 11th edit. 420, 1955
5 Hertig A T Am Jour Obst Gyn 62 926 1951
6 John Peel British Obstetric and Gynaecological Practice First edit. 434, 1955
7 Leopold Quoted by Novak, Ref No 9
8 Norris Quoted by Novak Ref No 1
9 Novak Gynaecologic and Obstetric Pathology 4th edit 482 1958

implantation) But these are penetrated by trophoblast which pushes into the deeper ovarian structure (Juxta-follicular implantation)

It is accepted after Meyer's work on endometriosis that endometrial tissue is frequently present in the ovary or a tissue which is potentially capable of development into the endometrial tissue under some circumstances This affords a favourable anchoring for the fertilized ovum

The site of implantation is Graafian follicle, which is entered by spermatozoa through the site of rupture or possibly by the direct penetration of its walls, egg shell may be impregnated when lying upon the surface of the ovary or after its discharge from the follicle and may excavate a bed for itself In the cells lining the follicle the fertilized ovum finds a nidus and pursues the usual course Greater part of the sac is unsupported except for its delicate follicular wall

Ovary contains a large blood clot in which are found amniotic membrane and chorionic villi The clot and products of gestation are enclosed in complete capsule of ovarian tissue, true decidue are not formed but patches of decidual cells are seen in stroma of medulla and cortex

It is not possible to diagnose ovarian pregnancy prior to operation Even at laparotomy the Spiegelberg's criteria have to be strictly followed They are

(1) Tube on the affected side must be intact and separate from the ovary
(2) Foetal sac must occupy the position of the ovary
(3) Foetal sac must be connected to the uterus by the utero-ovarian ligament
(4) Definite ovarian tissue must be found in the wall of the sac

To these, Norris, in 1909, added that the tube must show no microscopic evidence of pregnancy Stander says that ovarian tissue must be found in the wall of the sac at several places, at some distance from each other Baden and Heines modify it by saying that unquestionable ovarian tissue must be demonstrated in the wall of sac in several places at some distance from each other, and intervening between foetal tissues and any adherent extraneous tissue But the naked eye appearances are usually characteristic, as there is a normal fallopian tube and normal mesosaplinx with the cap of ovarian tissue of variable size

In the case presented, the history of amenorrhoea, the pain following it and physical findings clearly suggested the diagnosis of disturbed ectopic gestation But the improvement in pulse and the general condition which she has shown made us wait for some time more The patient meanwhile had another attack of severe pain in the abdomen with clear cut findings of intraperitoneal haemorrhage and she was taken for immediate laparotomy, which confirmed our diagnosis of ruptured ectopic, but this was in the ovary and not in the tube

Because of the normal sized ovary and small haematoma the possibility of corpus luteum haemorrhage was thought of but the histological examination confirmed the diagnosis of

and one hourly aspiration was done Nothing was given by mouth Inj 5% Glucose Saline drip was started and Inj Crysta-Penicillin 5 lacs 6 hourly and Inj Dihydro Streptomycine 1 gm daily were given intra muscularly Her temperature pulse and respirations were charted half hourly and blood pressure was recorded two hourly to know the progress of the disease

After reading the skiagram operative line of treatment was decided though clinical picture was not suggestive of it There was no history of any acute attack of pain in the abdomen or collapse before to think of early rupture of the fallopian tube or the uterus

Operation Abdomen was opened under spinal anaesthesia (Nupercaine (5%)—1 8 c c) Dark blood was aspirated and the dead foetus and placenta were removed from the peritoneal cavity

To my surprise both the tubes and ovaries were normal but there was a big rent on the right side of the uterus which was extending to the broad ligament too Luckily uterine arteries were not involved Uterus was retracted and friable which was suggestive of early rupture of the uterus which resulted in secondary abdominal pregnancy Subtotal hysterectomy was done Abdomen was closed in layers 300 c c of blood of the same group was transfused Patient was transferred to the ward with pulse rate 110 per minute with good volume and blood pressure 110/70 mm/Hg

Post Operative. Temperature pulse respirations and intake and output were charted half hourly Inj glucose (5%) saline with Vit C 500 mgms and Achromycin (Lederle) 500 mgms in drip within 24 hours were continued intravenously for 72 hours after the operation Ryle s tube was removed on the 4th day as the condition of the patient was satisfactory Inj Penicillin Cryst 5 lacs and Inj Dihydro-streptomycin ½ gm b d were given up to 7th day All stitches were removed on the 10th day of the operation and patient was discharged on 12th day in a good condition

Discussion

In this case of secondary abdominal pregnancy following primary intrauterine pregnancy which is very rare, it was very difficult to suspect rupture of the uterus, when

(1) Patient came with a typical picture of acute intestinal obstruction with pregnancy

(2) She was moving and eating without any trouble, once the obstruction was relieved

(3) General condition of the patient was quite satisfactory before and after the operation

The cause of rupture in this case is evidently an undetected transverse presentation, which could not be dia gnosed clinically, and detected by a skiagram It shows the importance of radiology in obstetrics, a life-saving measure

Acknowledgment

I am thankful to Dr H B Bhatt, M S , F C P S , the Chief Medical Officer at the Surat General Hospital, Surat, for his kind permission to publish this case I also thank my friend, Dr L F D.D'souza, M B B S , D A , for giving anaesthesia for this case and lastly, I am grateful to the Nursing Staff for looking after this case

SECONDARY ABDOMINAL PREGNANCY FOLLOWING INTRAUTERINE PREGNANCY

(A Case Report)

by

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Secondary abdominal pregnancy is a very rare condition It occurs (approximately) once in every 15,000 pregnancies Almost all cases are secondary to an early tubal pregnancy rupturing into the peritoneal cavity Secondary abdominal pregnancy following intrauterine pregnancy is explained by post-operative separation of the uterine wound of a previous caesarean section or by early rupture of the uterus The case recorded here is a case of secondary abdominal pregnancy following early silent rupture of the uterus

Case Report Mrs D , aged 22 years, was admitted to the hospital on 21st December 1959 at 12-30 P M This case was transferred from a small maternity home in a nearby village for prolonged labour, fever, distension of abdomen, pain in the abdomen, vomiting and constipation

History On admission, she complained of (1) fever for the last two days, (2) constipation for 4 days, (3) pain and distension of the abdomen for 2 days, (4) vomiting, (5) slight bleeding per vaginam 2 days back She was full-term

She was a second para having one male child living, 4 years of age

Examination On examination, the patient was found restless Her pulse rate was 100 per minute, with good volume, temperature was normal and her blood pressure was 120/70 mm/Hg

Anaemia was present Her heart and lungs were normal

On abdominal examination, distension was present It was quite tender but not rigid Peristaltic sounds were normally heard Fundal height was suggestive of full-term pregnancy No foetal parts were properly palpable because of distension Foetal heart sounds were also not properly heard

On vaginal examination, cervix was 1 finger dilated, but hanging Bag of membranes and presenting part were not properly made out

The patient was kept under observation thinking it to be a case of intestinal obstruction with pregnancy

Investigation Her R B C count was 3 2 millions/c mm , Hb was 52%, total W B C count was 9400/c mm Her blood group was A or II Rh was positive

Plain X-ray of the abdomen was taken to know the lie of the foetus and the presenting part To the surprise of all the Medical Officers, who had seen the case, foetus was found in transverse presentation, with Spalding's sign present From proper reading of the X-ray, I could find out that some foetal parts were lying beyond the uterine border, which led to the diagnosis of secondary abdominal pregnancy

Vaginal examination was done again to locate the uterus separately but it was not possible to make out Neither uterine sound was passed nor hysterogram done, with the fear of any further damage

Treatment On admission, soap water enema was given which did not give a good result Ryle's tube was introduced

plication as supporting structures are absent on one side and as such the pregnant horn of such a uterus is excessively mobile Moreover, the unilateral uteri are longer and narrower than normal with peritoneal and muscular attachments which are usually defective and these increase their tendency to torsion Presence of fibromyoma predisposes to this condition In early months it simulates ectopic gestation and in later months abruptio placentae

The case reported here occurred in double uterus and, because of the rarity of the condition and unusual symptoms presented, it is reported

Case Report

Mrs A aged 18 years Hindu female a primigravida first attended the outpatient department of the Medical College Hospital Nagpur on 2 7-56 She was eight months pregnant and came to book herself for confinement

Past medical history revealed nothing of significance

Menstrual History Menarche at 13 years 3-4/30 regular and painless amenorrhoea of 8 months. Married 2 years ago

Examination Findings. Woman of average build Not anaemic Cardiovascular respiratory and alimentary systems normal The uterus was enlarged to 34 weeks The presentation and position were diagnosed to be breech L S.A extended Foetal heart sounds were present B P 110/80 Urine no albumin or sugar Hb 10 8 gms % On 6 7-56 the patient was admitted for external version X ray confirmed the diagnosis of extended breech On vaginal examination nothing abnormal was noted and the pelvis was considered to be gynaecoid

10 7-56 External version was attempted without anaesthesia but failed The patient was kept under observation till 12-7 56 and then discharged with advice to attend the antenatal clinic The foetal heart sounds were present and the patient had no complaints at the time of discharge

12 7-56 The patient was readmitted on the same evening as an emergency with a history of severe pain in the abdomen and vomiting She had left the hospital at about one o clock and walked home a distance of nearly three miles and after taking her lunch she was resting when pain in the abdomen started at about 4 P.M

On Examination The B P was 120/80 pulse was 88/min urine showed no albumin Uterus was felt slightly tense mild contractions were present Breech LSA floating but no foetal heart sounds were present Slight tenderness was present in the lower abdomen No vaginal bleeding She was given 3 grs of sodium amytal and kept under observation

As the patient was restless 100 mgms of pethidine were given after about 3½ hours She slept well at night but next morning again complained of abdominal pain Vaginal examination revealed uneffaced closed cervix with the foetal parts at the brim of the pelvis During the day it was observed that the pulse rate was gradually increasing and the blood pressure rose to 140/90 She slept fairly well throughout the second night with sedatives No clear cut diagnosis was possible and it was put down as a case of concealed accidental haemorrhage because of the pain & tenderness the tense uterus and the slightly raised blood pressure

14 7 56 Thirty-six hours after admission the patient was again examined The uterus was very tense 36 weeks size and foetal parts could not be palpated easily No foetal heart sounds were present and there was no vaginal bleeding The pulse was 128/min the B P 140/90 On vaginal examination the cervix was noticed to be drawn up behind the symphysis pubis and not effaced or dilated and a soft mass was noticed in the posterior fornix The patient was complaining of severe backache as well as continuous dull pain in the abdomen. The following conditions were thought of in the differential diagnosis (a) Concealed accidental haemorrhage (b) Sacculation of the uterus (c) Extra-uterine pregnancy (d) Hypertonic type of uterine inertia but the signs and symptoms did not fit in with any of them Laparotomy was done about 40 hrs after admission It was then found

TORSION OF GRAVID HORN IN UTERUS DIDELPHYS

Case Report

by

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and

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Congenital anomalies of the female genital tract have always been the subject of great interest among obstetricians and gynaecologists Besides being anatomical curiosities, they present unusual and difficult obstetric problem when associated with pregnancy

Double uterus was first described by an Italian, Fransesco Antonio Catti in 1557, and Mauriceau reported the earliest case of pregnancy occurring in a double uterus in 1675 Kussmaul (1859) published a paper on this condition Miller (1922) reported 35 cases of pregnancy occurring in congenitally malformed uteri Way (1945) reported 10 cases and Hunter (1950) published a paper on double uterus Fenton and Singh (1952) reported 146 pregnancies in 62 patients with congenital anomalies of uterus Baker et al (1953) reported 108 cases from the literature and 9 of their own Holmes (1956) reported 9 cases and discussed the complications of pregnancy and labour occurring in them

All the above writers do not mention torsion of the gravid horn of a uterus as a complication in these cases Torsion of the gravid uterus is a rare complication of human pregnancy, and torsion of sufficient degree to produce acute abdominal calamity, by arresting the uterine circulation, is one of the rarest accidents of human gestation It is common in animals Robinson and DuVall made a study of this complication and could find in the literature 25 such cases Moreover, in the opinion of these authors certain of the reported cases were not true examples of this disorder They recorded a case which occurred in uterus bi cornis unicollis Eastman (1934) recorded a case of torsion of the gravid uterus occurring in a woman with bicornuate uterus Corr (1943) reported a case in which the condition occurred in both first and second pregnancy Caesarean section was performed on both the occasions, and there was a soft fibroid in the left wall of the uterus Macleod (1945) reported a case caused by an ovarian cyst in the pelvis where ovariotomy and hysterotomy were performed as the uterus appeared normal in colour

In normal uterus the round and broad ligaments being attached to both sides of the uterus prevent excessive torsion and rotation Bicornuate uterus predisposes to this com-

nant within 2 years of marriage, which shows that this anomaly did not interfere with fertility Congenital anomalies of uterus are often associated with congenital anomalies of urinary tract because of their close association during development but here no such abnormality was found This patient had no other obvious congenital abnormalities

Follow-up of the Case The case was regularly followed up Her menstrual cycle was regular The vaginal septum was excised in March 1958 and tubal insufflation was done Tube was found to be patent. Within three months of this, patient conceived and was quite normal throughout pregnancy On 15-3-59 she was delivered by lower segment caesarean section after 36 hours of labour for hypotonic type of uterine inertia There was a weak portion on the left side of uterus which was stitched in layers Post-operative period was uneventful and mother and baby were discharged in good condition eighteen days after the operation

Summary and Conclusions

A case of torsion of gravid horn of uterus didelphys is presented Clinically, it showed the features of concealed accidental haemorrhage and diagnosis was made after laparotomy

Congenital abnormalities of the uterus with pregnancy are met with rarely but are likely to be missed even by experienced obstetricians unless they are kept in mind while examining patients presenting with bizarre signs and symptoms

Acknowledgments

Our thanks are due to the Dean, Medical College and Hospital, Nagpur, for allowing us to publish this case

References

1 Baker et al Am Jour Obst Gyn 66, 580, 1953
2 Eastman Williams Obstetrics Ed by Nicholson J Eastman 11th edition, 648, 1955
3 Fenton A N and Singh B P Am Jour Obst. Gyn, 63, 744, 1952
4 Franscesco Antonio Catti 1557 quoted by Ref No 6
5 Holmes J A B M J, I, 1144, 1956
6 Hunter W Brit. Jour Obst Gyn, 57 721 1950
7 Kusmall 1859, quoted by Ref No 5
8 Mac Leod 1945 quoted by Munro Kerr
9 Mauriceau 1675, quoted by Ref No 5
10 Miller 1922 quoted by Ref No 5
11 Munro Kerr Operative Obstetrics 6th edition by Chassar Moir, 462 1956
12 Nesbitt R E L and George Corner J R. Obst Gyn Survey 11 311, 1956
13 Robinson and Duvall Quoted by Ref No 2, 648
14 Smith 1931, quoted by Ref No 5
15 Way S Brit. Jour Obst. Gyn, 52, 325, 1945

that it was a pregnancy of about 36 weeks in the left horn of a uterus didelphys, the gravid horn had undergone torsion of one and a half turns, the uterus appearing bluish and congested. The left tube and ovary had become gangrenous and there was thrombosis of the left ovarian vein. The right horn was enlarged to about 10 weeks and a fold of peritoneum could be seen passing from the bladder to the rectum in the sulcus between the two horns. The left horn of the uterus along with the left tube and ovary was excised in view of its doubtful appearance. A small incision into the right horn revealed that it contained only decidua. The patient was resuscitated with blood and intravenous fluids. The post-operative period was uneventful. Vaginal examination revealed that there was a thin vaginal septum in close contact with the right vaginal wall with a small slit like canal and normal looking cervices projecting into either compartment. The lower end of the septum did not reach up to the introitus but was about ¾ inch above it so that, on inspection of the perineum, only one vaginal orifice could be made out. The specimen fixed in formalin and then opened, consisted of a distended sac containing a normally developed male foetus weighing 5 lbs. 2 ozs.

Discussion

Torsion of a gravid uterus is a rare complication and this case presented many interesting features.

It was thought to be a case of concealed accidental haemorrhage because of the constant pain in abdomen, the rising pulse rate and blood pressure and the marked pallor which she showed after observation for 24 hours. Foetal parts were not easily palpable, uterus was tense and tender but the size of the uterus did not increase and there was no albumin in urine. She did not show the typical shock and collapse of concealed accidental haemorrhage. The pain was more in the lower uterine segment which is not consistent with accidental haemorrhage. But cases of torsion of uterus are usually mistaken for abruptio placentae in later months of pregnancy (Eastman (1952).

As there was predominant backache and pain in lower abdomen without any effect on the cervix, it was thought to be a case of hypertonic lower uterine segment. The high presenting part and thick cervix suggested it.

Sacculation of uterus was also thought of as the cervix was pushed high up and a soft bulging felt in pouch of Douglas which was thought to be the bulging posterior wall of uterus, but no history of disturbances of micturition was given early in pregnancy. Drawing up of the cervix can be explained by the increasing tension of the uterus.

Vagnial septum was entirely missed here at the first examination as it was soft and very thin because of stretching, each time vaginal examination being carried on through one compartment missing the other one. If this had been detected early the diagnosis of pregnancy occurring in the congenital anomaly of uterus would have been quite evident. This calamity could have been prevented by not attempting an external version. It is possible that in this case external version started off the torsion of uterus and when it became complete with the cutting of the blood supply the patient came with severe pain in abdomen and vomiting, thus explaining the symptom-free period of 48 hours after the attempt at external version.

There were no menstrual disorders in this case and she became preg-

The procedure followed in our series is as follows —

Pre-operative Preparation Nothing special

Anaesthesia General, gas and oxygen and ether

Operative Technique Tubes were exposed by muscle splitting or grid iron incision about 1" to 1½" long on both sides, site depending on the level of fallopian tubes according to the period of pregnancy Advantages of this incision over the midline incision are

(a) Least disturbance to uterus
(b) Tubes exposed immediately and easily
(c) No strain on the scar with abdomen stretching with growing pregnancy

Post-operative Care Patients were kept under morphia 1/6 gr 8 hourly for first 48 hours, as is the routine in our department for every major operation These patients were not given any extra bed rest On the 4th day all were out of bed and moving about

Case Reports

Case 1 Smt R P age 25 years 4th para was admitted on 17-12-57 At the time of admission she was 14 weeks preg nant She was sterilised by the above mentioned technique on 20 12-57 Post-operative period was uneventful There was no vaginal bleeding or any signs of abortion She was discharged in good condition on 30-12-57 Patient attended the Outdoor on 26 2-58 and on examination uterus was 24 weeks pregnant foetal parts and foetal movements were felt Abdominal scars were in good condition

On 1-4 58 patient attended the Out-patient Department again On examination uterine height was 22 weeks preg nancy foetal parts could be felt Plain X-ray of abdomen was taken X ray showed Foetal parts crumpled together like a ball looks like a dead foetus with anencephalus

Patient was readmitted on 7-4 58 and medical induction by pitocin drip given and she expelled a macerated anencephalic foetus

Puerperium—Uneventful

Case 2 Smt K D aged 40 years 10th para admitted on 15 1-58 Period of pregnancy was 14 weeks After admission she had upper respiratory catarrh and was treated for that Operation for sterilisation was done on 28 1 58 Post-operative period was uneventful She delivered at home On 15-12 58 patient attended the hospital with her 5 months old child On examination abdominal scars of old operations were in good condition and patient had no complaints

Case 3 Smt S R aged 28 years 3rd para admitted on 28-8 58 with history of 5 months amenorrhoea On examination the uterus was 20 weeks pregnant. Patient was operated upon on 29 8 58 Post-operative period was again uneventful and patient was discharged alright with her pregnancy undisturbed on 8-9 58 On 15 12 58 patient atended the hospital On examination per abdomen operation scars in good condition Uterine height up to the costal margin L O.A Head floating Foetal heart sounds good

Case 4 Smt. M aged 30 years 5th para admitted on 29-10 58 with history of 4½ months amenorrhoea On examination uterus was 20 weeks pregnant Operation for sterilisation was done 2 11-58 Post operative period was uneventful and patient was discharged alright with her preg nancy undisturbed on 13-11 58 She came back to us on 28-1 59 with 8 months' pregnancy

Case 5 Smt K aged 32 years 4th para admitted on 17 10-58 On admission she was 24 weeks pregnant Operation for sterilization was carried the next day On the 2nd day of the operation patient had a fair bout of bleeding per vaginam and mild painful contractions of the uterus were also felt She was given Inj Largactil 25 mgm. (I M) Bleeding stopped next morning and pregnancy continued undis

STERILISATION DURING PREGNANCY

by

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The old adage "Necessity is the mother of invention" still proves right

Women came repeatedly to the Outpatient Department, requesting termination of their early pregnancy women from all status of life—village woman, town woman, poor woman, middle class woman She did not want any more children, but in the interval when one was not pregnant, laziness, family burdens, daily chores, long distances, combined with a wishful thinking that she will not be pregnant again, prevented her from taking early medical advice Besides, she did not like the routine of using a check pessary every time It was tedious, less practical in her overcrowded house But as soon as she knew she was pregnant, she was willing to risk everything, she was mentally agitated After repeated refusals to help these women, an idea struck, why not do something for her, why not sterilise her at this stage? Here was a willing patient, whatever hopes she had at the back of her mind, our department promised nothing, except no future pregnancies We helped the Government policy of helping to reduce population, when a woman was a willing patient rather than allow her to change her mind later on, as we observed often happens after confinement After confinement her mental tension ceased She was tired and unwilling to undergo the unknown, afraid of anaesthesia and pain Besides the over-exuberant advice from relatives damped her spirits and the small amount of courage she possessed

A long tedious delivery or post-partum haemorrhage upset all calculations on the part of the doctor and the patient Moreover, there is always a risk of infection, if the woman gets herself examined by a dai before coming to hospital Sometimes, even a precipitate labour makes it impossible for the woman to reach hospital in time No such hitch existed if sterilisation was carried out in early pregnancy when uterus had grown out of pelvis and was still confined to the lower abdomen, i e anything from 14th to 24th weeks of pregnancy

A home delivery was possible after this procedure, thus avoiding strain on maternity section of overcrowded hospitals

A short series of 15 cases is here reported so as to make this known to other medical officers who would benefit the patients earlier, instead of wasting time to augment our statistics Further, compliance of results by other workers will help to make the procedure popular throughout the country

turbed At present, she is running the 9th month of her pregnancy and no other untoward effect is noticed so far

Case 6 Smt P K aged 30 years, fifth para, admitted on 14-1-59 History of 8 weeks' amenorrhea Sterilisation was done on 6-2-59 Corpus luteum of pregnancy was also removed as an experiment Discharged on 18-2-59 after an uneventful recovery She has been followed up in ante-natal clinic and had a normal confinement at term

Case 7 Smt K aged 30 years, 9th para, last delivery 2½ years ago She was 16 weeks pregnant Sought admission on 2-2-59 for retention of urine After catheterisation, *pregnancy of 16 weeks* was confirmed with no other pelvic abnormality She was operated on 13-2-59 After an uneventful convalescence she was discharged on 24-2-59

Case 8 Smt 25 years old, 5th para, was 14 weeks pregnant She was an old patient of tubercular cervicitis and was being treated for the last eight months Had sterilisation on 27-2-59, and was discharged on 7-3-59 Had a normal confinement on 20-8-59, a male baby, weighing 6 lbs 13 oz Mother and baby well and discharged on 26-8-59

Case 9 Smt Bimla, aged 32 years, 7th para with a pregnancy of 16 weeks, operated under general anaesthesia on 10-7-59, was discharged on 20-7-59

Case 10 Smt R P, 35 years old, pregnant 14 weeks, 9th para Admitted on 6-7-59 and was discharged on 20-7-59, uneventful recovery

Case 11 Smt P W, 36 years old, 10th Para, admitted 16 weeks pregnant on 13-7-59 After operation she ran temperature of 100° for a week which responded to a course of 10 injections of Dicrysticine with half gm Streptomycin Discharged on 28-7-59

Case 12 Smt R P, aged 40 years, was operated on 25-6-59, pregnant 20 weeks Soon after operation she had a fair bout of bleeding which lasted throughout the 25th and 26th of June 1959 On 27-6-59, she had blood-stained discharge which gradually lessened and she was discharged on 7-7-59 with pregnancy continuing

Case 13. Smt K N, age 26 years, 7th para, pregnancy 16 weeks, was operated on 3-8-60, discharged on 12-8-60, uneventful recovery after operation

Case 14 Smt D Y, aged 38 years, 7th para, pregnant 18 weeks, operated on 10-8-60, uneventful recovery Discharged on 22-8-1960

Case 15 Smt P K, aged 32 years, 5th para, 22nd week pregnant, operated on 11-8-60, uneventful recovery

Summary

Here are the reports of 15 cases of sterilisation during pregnancy In most of the cases, no complications attributable to this operation were noticed Out of these, some cases on follow-up have gone to full-term and one of them had a normal delivery at home and one pregnancy had to be terminated due to missed abortion, but as the pregnancy continued normally for two months after the operation and, later on, foetus was also found abnormal, this complication cannot be attributed to the operation itself Whenever some vaginal bleeding occurred, pregnancy continued uninterrupted

We appeal to doctors all over the country to remember to help women when they ask for it, and also in reducing the burden of over-population in every way possible

showed that patients receiving adequate substitution therapy tolerate analgesics and anaesthetics normally Rolland et al (1953) mentions the various hazards which an Addisonian patient has to face during pregnancy, labour and puerperium, but it has been observed by different authors that the clinical course of Addison's disease which has been adequately stabilised by cortisone therapy in the non-pregnant state is in no way adversely affected by pregnancy Further, there is nothing to suggest that cortisone administration affects the pregnancy itself adversely under these conditions (Hendon and Melick 1955, Hills et al 1954, Hunt et al 1953, Brent, 1950)

In the present case the pre-pregnancy dose of cortisone (50 mg daily) was maintained unchanged throughout the pregnancy At the 35th week of pregnancy the patient complained of swelling of her legs and ankles and her blood pressure was found to be higher than it had been previously She was advised to reduce her salt (sodium chloride) intake which reduced her oedema of the legs and brought the blood pressure down to normal level within a week Kaiser (1956) has suggested that during the last trimester there is a reduction in the demand for additional sodium chloride possibly due to some mineralocorticoid production by the placenta, and Thorn et al (1942) suggested that when maintenance therapy has included a mineralocorticoid, this should be curtailed during the last trimester During labour the stress of physical exertion, haemorrhage, pain and anaesthesia can precipitate an Addisonian crisis To forestall that complication cortisone 200 mg was given on the day of delivery and 100 mg for the next three days The high dosage was gradually reduced to 25 mg B D over the next four days

In the first case presented by the writer (Allahbadia 1960) the infant started vomiting on the second puerperal day and this was relieved by the administration of Ringer's solution in between the diluted feeds Though the blood chemistry done on the third day did not reveal any abnormality, but thinking in retrospect, it is possible that the foetal adrenal glands could have been inhibited (though temporarily) by the administration of heavy doses of cortisone to the mother during labour In the present case the baby was given 25 mg cortisone soon after birth and in reducing doses over the next four days The baby thrived well and was discharged in good condition on the fourteenth day of puerperium

Summary

One further case of pregnancy in Addison's Disease and its successful management during pregnancy, labour and puerperium is described The patient developed oedema of legs and ankles with raised blood pressure at the 35th week of pregnancy She was treated by reduced salt-intake She started labour spontaneously at the 38th week and was delivered with Wrigley's forceps after pudendal block analgesia Both mother and child were discharged in good condition

Acknowledgments

I wish to thank Mr A M Duthie for permission to present this case

higher than it had been previously She was advised to curtail her salt (sodium chloride) intake, though still maintained on cortisone 50 mg daily At the 36th week the swelling of her legs had disappeared and her blood pressure had come down to 125/78

Labour began spontaneously at the 38th week with contractions On her admission at 7-30 a m on 18th April, the foetal head was in mid-pelvic cavity, and the foetal heart was regular at 136 beats a minute The cervix was completely taken up and was ¾ dilated Contractions were quite strong and regular She was given intramuscular pethilorfan 100 mg and intramuscular cortisone 100 mg at 7 45 a m At 8 a m on 18th May, the membranes ruptured spontaneously and a moderate amount of clear liquor drained The foetal heart remained steady and regular Vaginal examination showed that the head was stationed just below the level of the ischial spines with the sagittal suture in the oblique diameter (R O A), no cord was felt The cervix was fully dilated After two hours of bearing-down efforts and good pains the foetal head had come down to the pelvic floor and was just visible, at the introitus, with each pain On vaginal examination it was found to be fully flexed and rotated but held up only by the thick and strong perineal muscles A pudendal block analgesia was induced with 0 5% Lignocaine and the foetal head delivered with Wrigley's forceps, after a right medio-lateral episiotomy Ergometrine 0 5 mg was given intravenously with the crowning of the head, and the placenta and membranes were delivered intact

She was given another 100 mg of cortisone on the day of delivery (total of 200 mg) and 100 mg daily for the next three days The high dosage of cortisone was gradually reduced to 25 mg B D over a period of one week The puerperium was uneventful and her blood pressure and urine were normal at the time of her discharge The infant, a male, cried soon after delivery The birth weight was 6 pounds 7½ ounces No abnormality was found on general physical examination of the baby He was given 25 mg cortisone on the first day, 20 mg on the second day, 15 mg on the third day, 10 mg on the 4th day, 5 mg on the fifth day and stopped on the 6th day Lactation was adequate and the baby was breast-fed He was discharged with the mother, in good condition, fully breast-fed on the 14th day, when the weight had risen to 6 pounds 9 ounces At the follow-up clinic six weeks later the baby was in satisfactory condition and weighed 7 pounds 12 ounces, being totally breast-fed

Discussion

Tuberculosis is the commonest cause of destruction of the adrenal cortex (Brent, 1950, Simpson, 1953, Dunlop, 1953, Fourman and Harley, 1954, and O'Sullivan, 1954) On the other hand, modern antibiotics should almost eliminate the spread of tuberculous infection to the adrenals However, simple atrophy will provide new cases and, irrespective of the cause, potent adrenal cortex hormones will so enhance the well being, the fertility and expectation of life of those with chronic adrenal insufficiency that an absolute increase in the number of patients with this disability and pregnancy should result

Before the introduction of replacement therapy with adrenocortical hormones, about ten years ago, the maternal mortality amongst patients with Addison's disease who became pregnant was thirty-five to forty-five per cent (Brent, 1950) The mortality of even minor operations was 100% and the summation of the obstetrical and surgical risks is illustrated by the recorded fatalities following operative termination of pregnancy (Thorn et al, 1942, Van Zwanenberg, 1945, Cohen, 1948, Brent, 1950) But recently Papper and Cahill (1952) and Dundee (1957)

ABORTION FOLLOWING HAEMORRHAGIC SMALL POX

by

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Cases of haemorrhagic small-pox, especially during pregnancy, are extremely rare Probably such cases are missed or are taken for some blood dyscrasias Further, pregnancy appears to affect the course of the disease adversely and the patient often dies before any signs or symptoms suggestive of the fatal condition become apparent In the present communication a fatal case of abortion following haemorrhagic small-pox is reported

Case Report

A female aged 18 years was admitted with a history of 4½ months amenorrhoea and fever and headache of 8 days' duration On the 4th day of fever patient developed a rash all over the body followed by bleeding per vaginam On examination she was found to be anaemic with petechial haemorrhages all over the body There were subconjunctival haemorrhages and haemorrhagic spots on palate and pharynx Pulse 130/mt Resp 30/mt Rales were heard on both sides of the chest Blood pressure 140/80 There was no increase in the number of petechiae after removing the tourniquet. Vaginal examination revealed cervix open with products of conception in the cervical canal Digital evacuation of the uterus was done since the patient was bleeding A provisional diagnosis of haemorrhagic diathesis? haemorrhagic small pox was made Patient s condition became worse and she expired within two hours of admission

P M Findings Fairly built and fairly nourished body The whole body including palms and soles showed multiple petechial haemorrhages Over the chest wall there were large patches of haemorrhages about 2 cms in diameter There were a few tiny umbilicated vesicles on the left wrist and the lower abdominal wall The whole conjunctiva was blotted up due to massive sub-conjunctival haemorrhage Vaginal examination showed evidence of bleeding On opening the body there were petechial haemorrhages in the parietal pleura and pericardium and there was a small amount of haemorrhagic fluid in both pleural spaces Tongue showed petechial haemorrhages at the margins and the posterior part Tonsils showed intense congestion and sloughing Palate and pharynx showed small pin point haemorrhages There were submucosal haemorrhages in the oesophagus and stomach Small intestine showed congestion but the large intestine showed pin point submucous haemorrhages increasing progressively from the caecum to the rectum No vesicles were seen anywhere in the mucosa Mesenteric lymph nodes were enlarged and congested Liver appeared pale and showed small subcapsular haemorrhages. Spleen was moderately enlarged and congested Heart showed pericardial myocardial and sub-endocardial petechiae Lungs showed broncho pneumonic patches and oedema Uterus was enlarged and showed subserous haemorrhages No products of conception were seen Mucosal surface was covered

I am grateful to Dr R T Gaunt foı advıce ın the treatment of the patıent My thanks aıe due to the clınıc secretary for heı ınvaluable help

References

1 Allhabadıa N K J Obst Gyn, Brıt Emp, 67, 641, 1960
2 Brent F Amer J Surg, 79, 645, 1950
3 Cohen M Arch ıntern Med, 81, 879, 1948
4 Dundee J W Brıt J Anaesth, 29, 166, 1957
5 Dunlop D M Proc R Soc Med, 46, 565, 1953
6 Fourman P and Harler A R Lancet, 1, 334, 1954
7 Hendon J R, and Melock R A J Kentucky Med Assoc, 2, 141, 1955
8 Hılls A G, Vennıng E H, Dohen E C, Webster G D, and Rıchardson E M J Clın Invest, 33, 1466, 1954
9 Hunt A B and McConahey W M Amer J Obst, Gyn, 66, 970, 1953
10 Kaıser I H J Clın Endocrın, 16, 1251-1261, September 1956
11 O'Sullıvan D J Irısh Med Assoc, 36, 315, 1954
12 Papper E M and Cahıll G F J Amer Med Ass, 158, 174, 1952
13 Rolland C F, Matthews J D, and Matthews G D J Obst. Gyn Brıt Emp, 60, 57, 1953
14 Sımpson S L Proc R Soc Med, 46, 566, 1953
15 Thorn G W, Dorrance S S and Day E Ann ıntern Med, 16, 1051, 1942
16 Van Zwanenberg D St Bart's Hosp J, 49, 31, 1945

Death is usually inevitable in purpura variolosa, particularly when associated with pregnancy The death in this case has occurred following abortion, which in turn might have been due to internal haemorrhage in the uterus

Summary

1 A case of purpura variolosa resulting in death following abortion is reported

2 The case is interesting because it occurred in the earlier part of pregnancy We came across no similar cases in the literature where purpura variolosa occurred in the early pa of pregnancy resulting in abortic and death

References

1 Gupta C K. Ind Med Gaz., 8 623 1951

2 Paranjothy D and Samuel I Jou Obst & Gyn Brit Emp, 67 30 1960

3 Rivers T Viral and Rickettsi Infections of Man Lippincot Philadelphia p 315, 1948

4 Wolman M Am J Clin Patl 21 1127 1138 1951.



Fig 1
Section through the skin showing hydropic degeneration of the cells of the epidermis with separation of dermo epidermal junction *Upper corium shows infiltration by round cells* (H & E. x 210)

with haemorrhagic slough Cervix and vagina showed haemorrhages Kidney and bladder showed petechial haemorrhages

Microscopy Sections through the vesicles on the skin from the wrist showed separation of the epidermis from the dermis at the basal layer, forming small vesicles The cells surrounding this area showed hydropic degeneration and ballooning Several inclusion bodies could be seen in the cells of the stratum Malpighium surrounding this vesicle as well as in other areas They were seen as round or oval eosinophilic bodies in the cytoplasm of these cells The dermis showed sparse infiltration of the upper cordium by round cells

Sections through the trachea showed focal areas of desquamation of epithelium with submucous haemorrhages and infiltration with round cells Lungs showed confluent type of broncho-pneumonia and in some areas congestion and oedema

Tongue showed hydropic degeneration of the epithelium with submucous haemorrhages In some areas the cells showed cytoplasmic inclusion bodies similar to those seen in the skin Section through the oesophagus, stomach and intestines showed submucous haemorrhages and round cell infiltration

Histology of other organs showed petechial haemorrhages as seen in the gross specimens

Discussion

Review of literature shows that very few such cases are reported Wolman has reported one case of purpura variolosa Gupta (1951) reported his experience with small-pox based on the studies of 354 cases in the refugee camps of Jammu and its outskirts In this series he came across 10 cases of small-pox associated with pregnancy Three of them died before the appearance of the rash and the diagnosis was missed The rest of the cases had typical symptoms of small-pox followed by rash on the third day All these cases were fatal Paranjothy and Samuel (1960) reported a fatal case of purpura variolosa in a woman nearing full-term

In the present case the diagnosis suspected was antemortem and was confirmed at autopsy Gupta in the study of his cases has stated that this form of 'malignant type of small-pox' affected only pregnant women approaching full-term The case reported by Paranjothy and Samuel also occurred in the eighth month of pregnancy Interest in the present case is due to its occurrence in the second trimester resulting in abortion followed by death A review of literature did not show a similar case

Clinically two forms of haemorrhagic small-pox are recognised — (1) purpura variolosa, inevitably fatal and death generally occurs before the typical rash appears, it manifests as a wide-spread purpuric rash, and (2) variola haemorrhagica pustulosa, where the typical small-pox rash appears and haemorrhage occurs into the vesicles The present case showed features of purpura variolosa

Paranjothy and Samuel noted the vesicles in the intestinal tract similar to those found in the skin in an ordinary case of small-pox Councilman, Magarath and Brinckerhoff (quoted by Rivers) found that the lesions are found in the skin, soft palate, pharynx and oesophagus In the present case vesicles were not seen in the gastro-intestinal tract, but a few vesicles were present on the palate, wrist and the abdominal wall The most marked feature, however, was the presence of petechial haemorrhages all over the body including conjunctiva and in all the organs of the body

BOOK REVIEW

TEXT-BOOK OF GYNAECOLOGY by Dr K M Masani Third Edition, 706 pages with 148 figures and 164 plates Popular Book Depot, Bombay 7

A third edition of Masani s Text-book of Gynaecology is now available A new chapter on "Intersexuality" written by Dr P N Shah is a useful addition The book is written in a simple and concise manner

Although the chapter on Anatomy of the female genital tract is well written and supplemented with short paragraphs of applied anatomy the photographs of the histology are lacking

The historical notes at the beginning of most of the chapters are informative and at the same time add interest to the text Inspite of numerous figures and photographs there appears to be some lack of adequate gynaecological pathology

The difference in the clinical approach to the gynaecological problems, as seen in India as compared to the western countries, has been well emphasised The bibliography at the end of each chapter is of help to the post-graduate students who may wish to refer to the original work For the undergraduate students, it is a comprehensive book

P K M

SURGERY AND CLINICAL PATHOLOGY IN THE TROPICS by Charles Bowesman, O B E, B A, M D, F R C S E, F A C S, D T M & H. Ed, Pages 1068, published by E & S Livingstone Ltd, Edinburgh and London, 1960

Surgery and Clinical Pathology in the Tropics by Charles Bowesman is a book which, as the author himself says, is not written for specialists, but for general medical officers There are five chapters on infertility, surgery in pregnancy, ectopic pregnancy, difficult and obstructed labour and complications of childbirth, which deal with obstetric and gynaec topics only, besides many chapters on nutrition, malaria, helminthiasis, ritual operations, genito-urinary diseases, blood transfusion, etc, would interest the obstetricians and gynaecologists

While fairly up-to-date, some of the statements in the chapter on infertility are not in keeping with modern literature or experience "The possibility of insertion of a plastic tube through the uterine wall in the normal tube position" and conception in two cases out of eight is worth noting

Certain references to social conditions in the tropics seem unwise in the present context of world affairs May wisdom prevent the author from repeating such statements in books in future

In the chapter on abortions (page 580) certain statements with reference to Rh negative patients appear as misguided His suggestion to treat certain concurrent diseases in pregnancy, indigenous to patients in the tropics, without laboratory investigations, is not scientific

In discussing the assessment of disproportion, the author does not seem

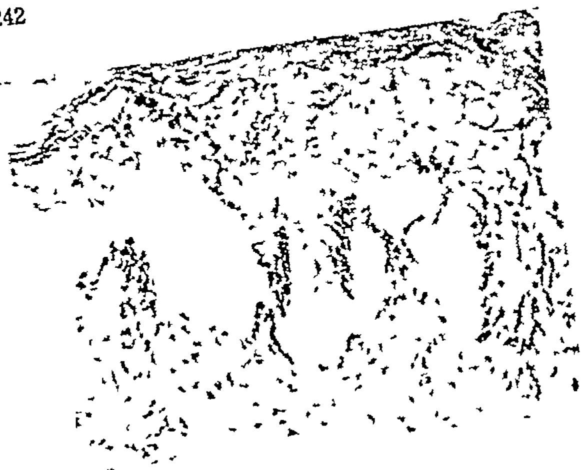


Fig 2
igh power view of the same (H & E x 420)

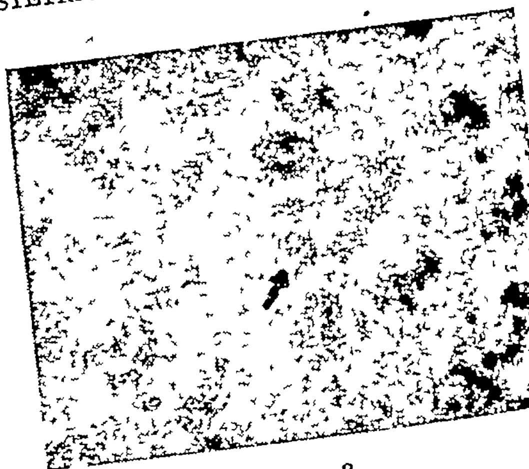


Fig 3
High power view of the epidermis show intracytoplasmic inclusion bodies (H x 840)



Fig 4
Section through the tonsil showing necrosis of the epithelium and the underlying lymphoid follicle (H & E x 70)



Fig 5
High power view of the same (H & E x 420)

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PRESIDENTIAL ADDRESS*

by

V N SHIRODKAR, M.D , F.R.C S., F.A C.S

Dr Subodh Mitra, distinguished guests, ladies and gentlemen

It is with a sense of mixed feelings that I stand before you this morning for delivering the presidential address Within a short time we have lost quite a few of our distinguished members, who during their life time served their respective societies and our Federation Dr Tampan Mrs Dadabhoy, Dr Bose Mrs Wadia are no longer with us We do miss them today They had endeared themselves to all of us by their jovial nature and by their valuable contributions to our speciality

I am very grateful to the members of this Federation for the great honour they have conferred upon me by choosing me as their president. I am certain that there are amongst you many who would have adorned this place more rightfully I apologise to those who feel that I have come in their way

On an occasion like this, it is customary to give vent to some of the pent-up feelings that one has, regarding certain problems that concern the medical profession Six problems that come to my mind are

(1) How to find good doctors for the villages
(2) How to find good teachers for the new colleges that are springing up
(3) Where to find the research workers for the new laboratories that are being established
(4) How to curb the enthusiasm of our ministers for Ayurveda
(5) Is socialisation of medicine good for the country? I mean the Employees' State Insurance Scheme
(6) How to deal with Hospital Staff Unions

Let me take them one by one

(1) *How to find good doctors for the villages* When cities are crowded with medical men, very few want to go to villages It is necessary to study why this occurs My

* Delivered at 11th All-India Obstetric and Gynaecological Congress at Calcutta on 2nd January 1961

to have paid sufficient attention to the modern ideas on android and anthropoid *pelves and on the need* to realise that in a border line pelvis difficulties may arise in subsequent labour due to other causes

The chapter on difficult and obstructed labour from the point of view of an obstetric specialist is rather disappointing Hydrocephalus as an indication for caesarean is a very unusual statement Infection and atony of the uterus are not at all mentioned as indications for caesarean hysterectomy

Rapair of rupture of the uterus, using few through and through sutures, gives 20 per cent mortality against 33 per cent with hysterectomy

The abdominal crises of sickle-cell disease needs to be kept in mind in differential diagnosis of ectopic in Africa Two ectopics, one on each side, quintuplets in ectopic and more than one in several cases arrest our attention The suggestion to preserve the distant end of the tube in ectopic for later transplantation deserves consideration Use of blood from the peritoneal cavity in cases of severe intraperitoneal flooding is suggested

A detailed discussion of urinary fistulae after delivery is given In abdominal approaches the author prefers the transperitoneal retrovesical approach for high vaginal *fistulae, particularly with scar tissue,* and for vesicocervical fistulae Transplantation of ureters is reserved for a few cases and a modified Nesbit technic is preferred

From a gynaecologist's standpoint the section on prolapse is most disappointing Watkin's abdominal interposition and similar Frankenthal's vaginal operation are advocated for second and third degree prolapse in women past the menopause and Manchester operation for prolapse of first and second degree in them Avoiding amputation of the cervix in young women is rightly stressed, both because of the occurrence of sterility or abortions, though I feel, in suitable cases this need not necessarily occur

Sling operations for stress incontinence are given a good space and described well

Any obstetrician or gynaecologist or a practitioner who can discriminate and utilise reading material would profit much from the experience of a surgeon who has had opportunity to do a lot of obstetric and gynaec work in Africa and has laid down in his own way his experience and results

A large number of illustrations are well prepared and useful

S B A

establishments to prevent duplication of expensive equipment The only way in which medical treatment in the villages differs from that in the towns is that the village doctor has no laboratory assistance and hence I am suggesting these mobile vans

(2) The second problem I wish to touch upon is how to find *Good Teachers for the New Medical Colleges* We cannot produce them overnight and so let us not multiply medical colleges It is better to enlarge the existing ones The retiring age of the existing teachers must be increased to 65 as in other countrise From 55 onwards these men should have a two-yearly check-up to certify fitness to work

(3) The third problem is *How to get research workers for the laboratories that are being provided* Regarding this matter, I entirely agree with the very valuable suggestions recently made by Dr Khanolkar, the Vice Chancellor of Bombay University and a life long research worker of international fame I quote below his suggestions "Training in research methods should constitute a compulsory part of our post-graduate medical education" This may be undertaken by introducing the following measures

(i) Systematic training in research techniques as a part of the Internship Programme

(ii) Prescribing research training and experience as an essential qualification for teaching posts in medical colleges and institutions

The respective Governments and Universities should take steps to implement these most valuable suggestions

(4) The fourth problem is *How to curb the enthusiasm of our Ministers for Ayurveda* It is time some one drove into their heads that modern medicine is nothing but Ayurveda improved upon and brought to date with three hundred years of scientific research Are these ministers prepared to get themselves and their children treated by Shudha Ayurveda, when they suffer from septic fevers, typhoid, cholera, malaria, diabetes and tetanus? Do they still wish to have crude surgery practised on them by these Ayurvedacharyas?

We all have great respect for our ancient system of medicine, but that should not prevent us from taking advantage of scientific advances Our Prime Minister has expressed his views on this subject on many an occasion He says that, whatever is good in any form of medicine should be utilised for the benefit of humanity Why not establish a chair in Ayurveda at each medical college?

(5) A word or two about *Socialisation of Medicine or the Industrial Health Insurance Scheme* Formerly, the mills and factories had their own dispensaries and their doctors used to look after the workers and their families The workers got personal attention and good medicines and they were happy Now the only person who is happy is the doctor, who in the early days of his career would have earned very little, and is now assured of a steady income From what he gets, he cannot give good medicines and pay free visits to the patients' houses So a great deal of

own feeling is that, during their medical education which is given to them in large cities, they get addicted to the amenities available in the cities This may be true in some respects and some of us may stick to the cities A graduate, after passing, is looking out for a decent post When he reads the advertisements in the papers and sees the meagre salaries offered by the government, he makes up his mind to stick to the city and take his chance there He wastes quite a few years taking small jobs in the hospitals and working with senior practitioners and earns enough to start on his own If he is not successful, he looks towards foreign countries for employment Many of our young medicos have settled in U K , Africa and Middle East, the chief attraction being the large salaries offered They feel that they can live decently there, although they miss their homes and relations The foreign missionaries from abroad came to India and established cottage hospitals and dispensaries in far-off villages They were fired with the enthusiasm for spreading their religion and they were brought up from childhood in an atmosphere of christian spirit These men have done a great deal for India We have to learn from them Our Ramkrishna Mission is doing a great deal of good work and I feel that it is people from such a mission who will make good doctors for the villagers Government is trying various experiments They established a large number of institutions giving training in ayurveda and allopathy calling it the Integrated Course Thev thought that the graduates from these colleges will go to the villages Very few go to the villages, for the same reasons as were mentioned for the graduates passed out from the allopathic colleges Now they are thinking of reviving the licentiate course They have blundered enough and should now stop further experimenting Let us take good, honest young men from the villages Those that have passed their S S C examination should be taken up on their signing a bond that they will devote themselves to the villages Sons of farmers should be given preference Their hostels in the cities should have a missionary set up where the true principles of their religion are inculcated into them along with their studies Their course should be simplified They should read books which are studied by nurses They should spend most of their time in the O P Department and the casualty wards They must be taught methods of diagnosis and treatment of common disorders They should be taught common laboratory tests One could thus train young enthusiastic men with a missionary spirit and call them Village Health Supervisors These men should be in touch with the civil surgeons in adjoining towns and cities by 'phone, where they could discuss difficult cases with them and solve their problems The civil surgeon should have at his command well-equipped motor vans which have in them clinical laboratories run by a technician and another van equipped for emergency operation The servicing and repair of such vans should be in the hands of mechanics attached to police and military workshops available in the vicinity by a special arrangement I want these mechanics to be attached to existing

HYDROCHLORTHIAZIDE IN THE MANAGEMENT OF PRE ECLAMPTIC TOXAEMIA

by

M K Krishna Menon, B A M.D

Director Institute of Obstetrics and Gynaecology, Govt Hospital for Women and Children Madras-8 and Professor of Obstetrics & Gynaecology Madras Medical College

Faiz Jehan M D, *Research Assistant* and N Ramaswamy, M.Sc, *Biochemist*

Diuretics have played an essential part in the empirical treatment of pregnancy toxaemia even though there is an almost general observation that diuretics on the whole are less effective in pregnant oedematous patients than in other patients

The introduction of chlorothiazide is probably the major advance in therapeutics since the advent of penicillin It is clearly an extremely potent diuretic which is effective orally in most oedematous states It is, however, beset with certain dangers Hypokalaemia can occur despite potassium supplements and resistance to the drug can occur after repeated administrations

Recently, hydrochlorthiazide has been introduced This is a derivative of chlorothiazide Experimental work and early clinical experience (Ford 1957, Moyer et al 1959) show that weight for weight hydrochlorthiazide is more potent than chlorothiazide, de Stevens et al (1958) showed that in vitro hydrochlorthiazide appeared to inhibit carbonic anhydrase less than chlorothiazide and claimed that hydrochlorthiazide induced less potassium loss (Richterich 1959)

Impressed by such evidence, we embarked upon evaluating the use of hydrochlorthiazide as a diuretic in the management of pre-eclamptic toxaemia in pregnancy The compound used was one which is marketed under the trade name of "Esidrex" by Ciba Pharmaceuticals

Method and Material

Evaluation of diuretic drug in pregnant women with oedema possesses

malpractice has crept in The personal relationship between the doctor and his patients is gone

(6) Lastly, I must bring to your notice a recent ruling by the Supreme Court that hospitals, private or public, are an industry and so the workers are to be treated on the same basis So the workers, ward boys, ayahs, mehtars and nurses have formed their unions and they feel that it is the secretary of their union, who is their boss and not the doctor running the hospital This leads to a complete lack of discipline Lately the Government has had a dose of their own medicine The workers and nurses at the Government hospitals in New Delhi are getting out of hand and are a constant source of irritation to the Minister and the Superintendents of hospitals They are now asking the Judges of the Supreme Court why he gave such a judgment! The Judge promptly showed them their own law in which they have inserted a clause by which the hospitals are included under industry

Didn't they get a big dose recently when there was a general strike? I hope the Health Minister will delete hospitals from the industrial group Our profession is always referred to as a noble profession and we have no rest periods We are expected to be at the beck and call of the public all the hours of day and night Why cannot the nurses and ward boys be the limbs of this noble profession and work like us twelve hours a day? This service should be on a semi-domestic servant basis, otherwise, I sympathise with the patients of the future

I would like to make one suggestion for the future Conferences The Chief Guest, the Chairman and the President, should be given just ten minutes each and more time should be given to the papers Twenty minutes should be the minimum and original papers that add even a small amount to existing knowledge should be given a minimum of half an hour

With these words, I thank you again for the honour you have done me I thank the chief guest and other distinguished guests for honouring us by their presence this morning, and the Chairman and the Members of the Reception Committee for carrying out this great task so very efficiently May the ties that exist between the different member bodies of the Federation get stronger and stronger and let not small matters disrupt our unity JAI HIND

(de Stevens et al, 1958) Previous estimates of the relative weights of hydrochlorthiazide and chlorothiazide which produce equal Na diuresis in man have ranged from 1 80 (Ford, 1959) to 1 21 (Richterich, 1958) and 1 10 (Moyer et al, 1959) Ford and Moyer et al found a gram of hydrochlorthiazide produced almost maximum diuresis in patients with heart failure Esidrex appears to have also a long duration of action, since in a 6-hour experiment in dogs, the diuretic effect of the drug was distributed over the entire period while that of chlorothiazide was exerted primarily in the first four hours with very little, if any, effect in the last two hours of the test period

Platts found that hydrochlorthiazide was a very potent diuretic in congestive heart failure cases and that it produced reduction in plasma potassium in 9 of 11 patients who were treated for longer periods However, no hypokalaemia was observed in those patients who were treated for a short while Harvard and Fenton also found this drug to be very effective in doses of 100-200 mg, i e 1/10th the dose of chlorothiazide Hypokalaemia and excessive potassium excretion were not found in patients with oedema of recent origin

We have used Esidrex on 76 patients, 69 of whom were suffering from pre-eclamptic toxamia while 7 were grossly oedematous with anaemia and hypoprotinaemia

50 of our patients gave good response and 21 fair response In these patients, the drug caused an approximately equimolar loss of Cl and Na Usually, the increase in water, Na and Cl excretion was as great on the first day as on any subsequent day but in some patients the maximum response was not obtained until the third or fourth day As oedema subsided the weight loss levelled off The response was poor in 5 cases All the cases of anaemia with oedema responded fairly well to the drug with no side effects This drug in our experience has been outstandingly free from toxic effects No hypokalaemia or excess of potassium excretion was observed in any of our cases The serum electrolytes (Na, K and Cl) did not show any significant alteration before and after treatment However, the oedema in our cases was of recent origin and the drug was administered for only a short period

Our impression from this study of 76 cases is that the drug is a very effective oral diuretic and that doses of 50-100 mg in Grade A toxaemia and 100-150 mg daily in Grade B toxaemia produce maximum diuresis The drug was administered on an average for 4 2 days, minimum being 3 days and maximum 10 days

Summary

1 A new oral diuretic, Esidrex (Hydrochlorthiazide), a hydrogenated derivative of chlorothiazide, was tried in 76 oedematous patients of which 69 were cases of pre-eclamptic toxaemia and 7 anaemia in pregnancy

2 50-150 mg per day of the drug was administered, the dose depending on the severity of the oedema

3 Average drug period was 4 2 days, minimum being 3 days and maximum 10 days

4 Response was judged by clearance of oedema, reduction in weight, increase in daily urinary output

There is no significant change in serum electrolytes before and after treatment

Effect on Blood Pressure

It is difficult to assess the hypotensive value of any drug in pre-eclamptic toxaemia for the obvious reason that in many cases simple rest in bed alone brings down the blood pressure to normotensive levels especially in the milder grades of toxaemia We have compared the range of blood pressure in Grade A and Grade B toxaemia during the drug period to the range in similar cases treated by simple bed rest, sedation and diuretics like ammonium chloride Our observation has been that hydrochlorthiazide by itself has not shown any significant hypotensive effect which cannot be obtained by rest and sedatives

Table VI shows the overall response of the cases to the drug classified as good, fair and poor

and white cells did not show any alteration during the drug period

Discussion

In recent years, the search for an orally effective diuretic has led to the introduction of several substances Until the advent of chlorothiazide and hydrochlorthiazide, parenteral mercurial diuretics were unquestionably the treatment of choice in the oedematous patients Acetazolamide (Diamox) though not destined itself for a star position pointed the way to a new series of potent diuretic agents that are effective by mouth

Esidrex, a hydrochlorthiazide, is derived from a benzene disulphonamide and is therefore chemically related to chlorothiazide It is a new oral diuretic which has recently become available for treating oedematous patients

Animal experiments have shown hydrochlorthiazide (Esidrex) to be a more potent diuretic than chlorothiazide on a weight for weight basis Its action is similar to chlorothiazide but unlike the latter it has little inhibitory action on carbonic anhydrase and its has been reported to have less effect on the diuresis of potassium

TABLE VI

Type of cases	Good		Fair		Poor	
	Total	Percentage	Total	Percentage	Total	Percentage
Grade A 38 cases	27	71 1	11	28 9	—	—
Grade B 31 cases	20	64 5	6	19 4	5	16.1
Anaemia 7 cases	3	42.9	4	57.1	—	—
Total 76 cases	50	65 8	21	27 6	5	6 6

Toxic Effects

No toxic effects, including hypokalaemia, agranulocytosis or thrombocytopenia were observed in these cases The haemoglobin, red cells

AETIOLOGICAL FACTORS OF STERILITY IN BIHAR

by

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Resident Surgeon,

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Introduction

The adult male and adult female are normally fertile, that is to say he is capable of begetting and she of conceiving and carrying a child Hence almost all married couples anticipate as a matter of course that pregnancy will occur when desired In the past if this did not occur, the onus for the barrenness was put on the woman

Sterility denotes complete inability to reproduce The cause for it may be either in the male or the female It may be due to the failure of the male to produce viable spermatozoa or of the female to produce fertilizable ova In some cases the fault is not in spermatogenesis or ovulation, but in a failure to bring about the union of the gametes The male may be incapable of delivering spermatozoa into the vagina, or the spermatozoa may be obstructed in their passage through the genital tract In some cases conception occurs, but pregnancy regularly ends in miscarriage

More progress on this subject has been made within the life time of many alive today than in the whole previous history of the human race It is now possible to assess the causes of infertility in many if not all childless couples although we still have to echo Nicholas Culpeper who in 1652 wrote in his "English Physician and Family Dispensatory", "There is a certain occult and secret species of barrenness that cannot be attributed to any cause at all" Sterility has been recorded to exist in about 15 per cent of all marriages In our own country it is clear from the following data that the problem is not a small one

Sl. no	Year	No of gynaeco-logical cases	Sterility cases	Percentage	Average of both years
1	1956	4 446	924	20 7 (approx)	20 4 %
2	1957	3,886	832	20.1 (approx)	

It has thus become more than an eternal medical problem—a problem closely affecting the welfare of the society because of its relationship to marital happiness Sterility ranks

Abridged

Awarded Dr S N Bhansali Charitable Trust Prize 1958 by Bombay Obstetric and Gynaecological Society

5 During the drug period, the average increase in the urinary output was 925 ml in 24 hours and maximum urinary output in 24 hours was 3870 ml, average weight reduction was 8 8 pounds and maximum was 16 25 pounds

6 Good response was observed in 65 8%, fair in 27 6% and poor in 6 6% of cases

7 The urinary and serum electrolytes (Na, K and Cl) have been estimated before and after the treatment in 54 cases No significant alteration in the serum electrolytes were observed

8 The drug cannot be said to help by itself in reducing the blood pressure

Conclusion

Its ease of administration, being effective orally, flexibility of dosage, its potency, production of maximum diuresis with no side effects makes one regard hydrochlorthiazide as the diuretic of choice at present available in the management of pre-eclamptic toxaemia, more so when its use is only for a short period

We express our thanks, for all the assistance rendered, to Messrs Ciba Pharmaceuticals and to the Madras State Research Committee under whose auspices the work was carried out for permission to publish the results

References

1 Bayless R I S Brit Med Jour, 1, 41, 1959

2 Davis D W, Evan B Brit Med Jour, 1, 967, 1958

3 de Stevens G et al Experimenta, 14, 463, 1958

4 Ford R V, Moyer J A, Spurr C C Arch Int Med, 100, 582, 1957

5 Howard C W H, Fenton J C B Brit Med Jour, 1, 1560, 1959

6 Moyer J H et al Amer J Cardiol, 3, 113, 1959

7 Platts M M Brit Med Jour, 1, 1565, 1959

8 Richterich R et al Schweiz Med Wschr, 89, 353, 1959

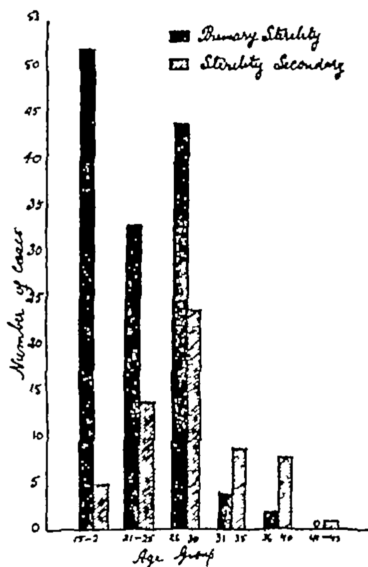
9 Slater J D H and Nabarro J D N Lancet, 1, 124, 1958

biopsy was done as a routine in the pre-menstrual phase in every case for the evidence of ovulation as well as to detect unsuspected cases of pelvic tuberculosis Husband's seminological examination was advised and subsequent to this Huhner's post-coital test and Kurzrok-Miller test were undertaken with a view to exclude defective insemination

Results

Out of 200 cases studied, 139 (69 5%) belonged to primary and 61 (30 5%) to secondary sterility group The age of the youngest patient who came for investigation was 16 years and that of the oldest 41 years Graph I shows relationship between the primary and secondary sterility in different age groups

The duration of sterility in these patients ranged between 1 to 20 years The maximum number of patients of both primary and secondary groups were found to have had a duration of sterility of 6-10 years



Graph I
Incidence of primary and secondary sterility in different age groups

TABLE I
Duration of Sterility

Series	Under 5 years	6 10 years	11-15 years	16-20 years	Above 20 years
Primary sterility	50	55	26	8	0
Secondary sterility	20	29	8	3	1

All these cases attended hospital with various complaints and it was only a small number of cases who sought straightforward advice on account of sterility 72 5% of these sterility cases belonged to middle class, 18% to lower class and 9 5% to upper class of the society In certain percentage of cases, the history of low fertility was associated with either the wife s or the husband's family or both History of normal menstruation was obtained from 92 patients, and 84 had oligomenorrhoea, 11 menorrhagia, 4 irregular cycle 1 primary and 8 secondary amenorrhoea On pelvic examination uterus was found to be antevert-

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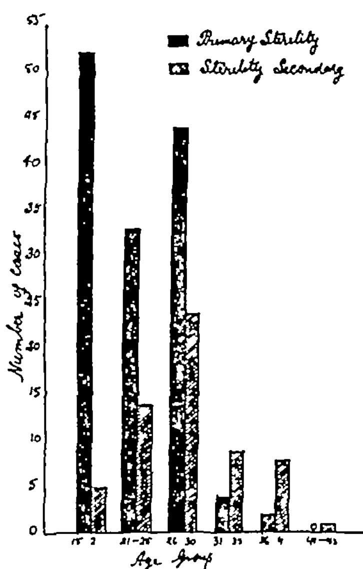
1 Bayless R I S Brit Med Jour, 1, 41, 1959
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high among the causes of deep unhappiness in marriage because a childless union lacks the strong cementing force which leads parents to subordinate all selfish desires for the common good of their offspring

Review of Literature

Great advance has been made during the last few decades in the direction of investigation and treatment of sterility

The tubal factor as a cause of sterility is in most instances first in importance to that of other contributory factors The earliest attempts to visualize the uterus and the tubes and thereby to test tubal patency were made in 1914 by Rubin and Carey They were independently experimenting with the injection of radio-opaque substance, such as Collargol into the uterine cavity It was seen that this substance outlined the uterus and in most cases it passed into the tubes and through them into the peritoneal cavity Thus it was obvious that hysterosalpingography provided a means by which tubal patency could be investigated, but it was not widely used until after the insufflation test was established a few years later

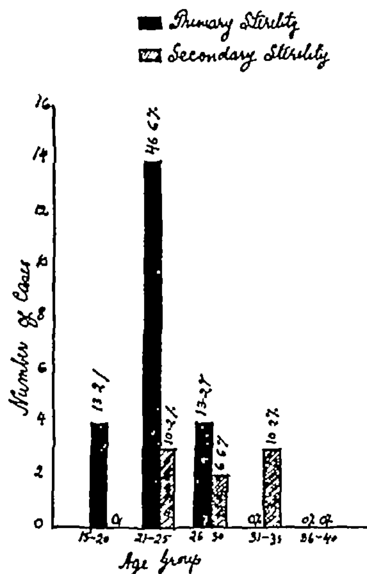
Ovulation is said to have occurred by noting secretory changes in the endometrium Randall and Herrel (1937) and Novak (1934) correlated the changes in the endometrium with the oestrogen-progesterone quantitative change in ovaries Endometrial [illegible] importance from the [illegible] of anovulatory men- [illegible] Tietze (1933) and Hart- [illegible] (1937)

[illegible] various other methods for the determination of ovulation such as fluctuation in the basal body temperature, urinary pregnanediol assay, the two-hour rat test of Farris, cervical mucus and vaginal smear (Papanicolaou, 1933) studies Wahi et al (1957) observed that the nature of the cycle may be determined by single vaginal smear study on 24th-26th day in a normal cycle of 28-30 days

The factor of insemination of the female generative tract was considered by Marion Sims as far back as hundred years ago and subsequently by Huhner with whose name the post-coital test is commonly associated He demonstrated the results of microscopic examination of the vaginal pool and cervical mucus following coitus Further, Miller and Kurzrok (1932) gathered useful information by carrying out invasion or incompatibility test in which the woman's mucus was examined in vitro mixed with (a) semen from her husband (b) semen from a man of known high fertility Observations were then made on the rate and degree of invasion of the mucus by the sperms and the duration of their survival in it

Materials and Methods

Two hundred cases from sterility clinic of D M C Hospital were studied during March 1957 to March 1958 A detailed history of both the partners was taken Clinical examination included general and local physical examination Routine laboratory investigations of blood and urine were done Tubal patency test was performed in the post-menstrual phase by tubal insufflation and hysterosalpingography Endometrial



Graph III
Incidence of success in different age groups.

out of 123 cases, who could be traced later The greatest number of pregnancies occurred between the age group 21 to 25 years and the lowest between 31 to 35 years

The aetiological factors have been arranged in Table III

TABLE III

Causes	No of cases	Percentage
Congenital anomalies	2	1%
Pelvic tumours	2	1%
Tubal occlusion	47	23.5%
Endocrine disturbances	63	31.5%
Factors of defective insemination of cervix	23	11.5%
Miscellaneous factors	33	16.5%
Male factor	16	8%
No significant pathology	14	7%

Discussion

In the present series a fairly high incidence (69 5%) of cases of primary sterility has been found Any of the causes can operate resulting in sterility either primary or secondary The causative factor of secondary sterility may either be in the male or the female Subsequent to the previous pregnancy, the male may have been subjected to one or several conditions depressing sperm function Venereal and metabolic type of diseases as well as those causing high fever and too frequent coitus have been proved to lower male fertility Similarly secondary sterility may also be attributed to obstetric sequelae such as uterine displacement, cervical laceration with endocervicitis, subinvolution of uterus and sometimes to tubal occlusion, either partial or complete, following even normal delivery

Age Index of Fertility

Physiologically, female susceptibility to conception is usually marked at one end by menarche and at the other by menopause The mere onset of menstruation is not always indicative of ovulation, as a matter of fact it commences a couple of years after menarche Hence there may be a time lag after puberty before fertility can be expressed More recently, Livi's study of a group of women married two years, shows the rate of fertility to reach a peak at 22 5 years after which there is a rapid decline to the end of reproductive life

Altough female fertility is usually marked by demonstrable physiological changes, male fertility has no precise distinction There is, however,

ed and anteflexed in 82, retroverted and retroflexed in 118 cases, palpable adnexa in 19, cervicitis in 11 and trichomonas vaginitis in 8 cases W R was positive in 12 cases only

Tubal patency test carried out by insufflation method showed blockage of tubes in 23 5 per cent of cases Hysterosalpingography confirmed tubal occlusion in only 15 out of 20 cases, in which tubes were diagnosed to be blocked by insufflation test and in the rest of the cases the tubes were patent

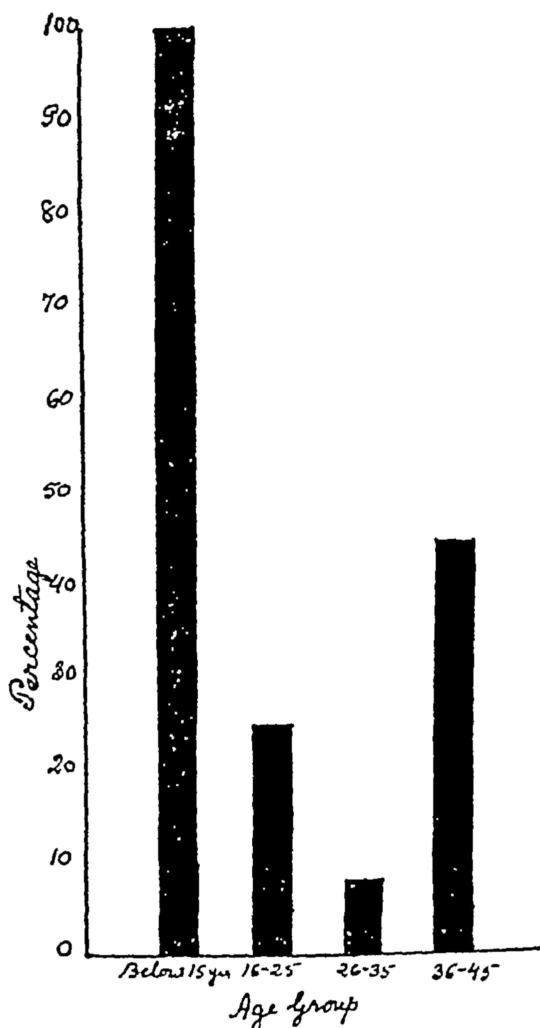
Endometrial biopsy was done in all cases to evaluate the menstrual status in these patients It revealed various types of disorder apart from the evidence of ovulation which is illustrated by Table II

TABLE II

Result of Endometrial Biopsy

	No of cases	Percentage
Ovulatory cycle	136	68
Mixed endometrium	14	7
Anovulatory cycle	39	19 5
Tuberculous endometritis	6	3 0
Chronic endometritis	5	2 5

The distribution of anovulatory cycle in different age groups is shown in Graph II



Graph II

Incidence of anovulatory cycle in different age groups

Husband's seminological examination in vitro was normal in 66%, oligospermia in 28% and azoospermia in 6% Huhner's post-coital test showed adequate insemination of the female generative tract in 88 5% of cases In 11 5% the test was negative An account of previous pregnancy labour child and puerperium was taken of the cases belonging to secondary sterility group In these cases pregnancy terminated variously in full-term normal deliveries, premature delivery, stillbirth and abortion History of living children was present in 30 cases only, and 31 had no live child Out of these 30 cases, who had living children, 12 had only daughters and the rest came on account of having single live male child Graph III illustrates the occurrence of pregnancy in 30 (24% approx)

factor Consequently anaemia and severe degree of avitaminosis are most common, producing hypo-function of various generative organs resulting in sterility Those who could afford to have better diet suffer from chronic bowel disorders and again vitamin B deficiency is the result

Psychological Factor of Sterility

The existence of an inter-relationship between psyche and soma is a fact beyond doubt Emotional conflicts can result in somatic dysfunction and psychological therapy is often able to bring improvement in such functions Psychiatrists strongly believe that unconscious longing for a child may be of considerable importance in the problem of infertility Conception occurring many years after marriage and sometimes after adoption of a child may be explained by the fact that as a woman becomes gradually reconciled to her sterility, the injurious influence on the follicular apparatus disappears

According to Stallworthy and Rubin, uterine irritability, tubal dyskinesia and blockage are more or less permanently observed in tense individuals

Psychogenic factor may be found in males as well The seminological findings are liable to vary greatly under different emotional states Therefore, the mere examination of semen showing either deficient or satisfactory report is not enough to label a man as immune

Effect of Contraception on Fertility

None of the patients in the present series gave history of practice of any kind of contraceptive method Rubin is of the opinion that the use of contraceptives causes sterility by bringing about changes in the cervical and vaginal mucosa and their secretions as well as in the vaginal bacterial flora The concensus of opinion is that the practice of contraception might bring temporary infertility as was evidenced in the reported cases when conception occurred on an average of three months after contraception was discontinued Seigler's pregnancy records indicate that there is usually an average of two months of temporary infertility for every year of practised contraception

Relation of Pelvic Disorders to Sterility

In a few cases, pelvic disorders, such as uterine anomalies, fibroids, ovarian tumours and infection of the genital tract were met with as a single factor in the causation of sterility Author detected 6 (3%) unsuspected cases of tuberculous endometritis, since the disease, which takes its root before puberty, results in sterility and otherwise remains symptomless Greater incidence has been mentioned by Sutherland (1943) 5%, Sharman (1947) 5 5% and Malkani (1954) 7 5% Halbrecht (1950) has commented that he found 5 cases of endometrial tuberculosis in culture of menstrual secretion where endometrial biopsy showed normal mucosa without any trace of tuberculosis Therefore, there can be no doubt that the number of positive observations increases proportionately with the frequency of examination

Tubal Factor

It has already been mentioned that

ed and anteflexed in 82, retroverted and retroflexed in 118 cases, palpable adnexa in 19, cervicitis in 11 and trichomonas vaginitis in 8 cases W R was positive in 12 cases only

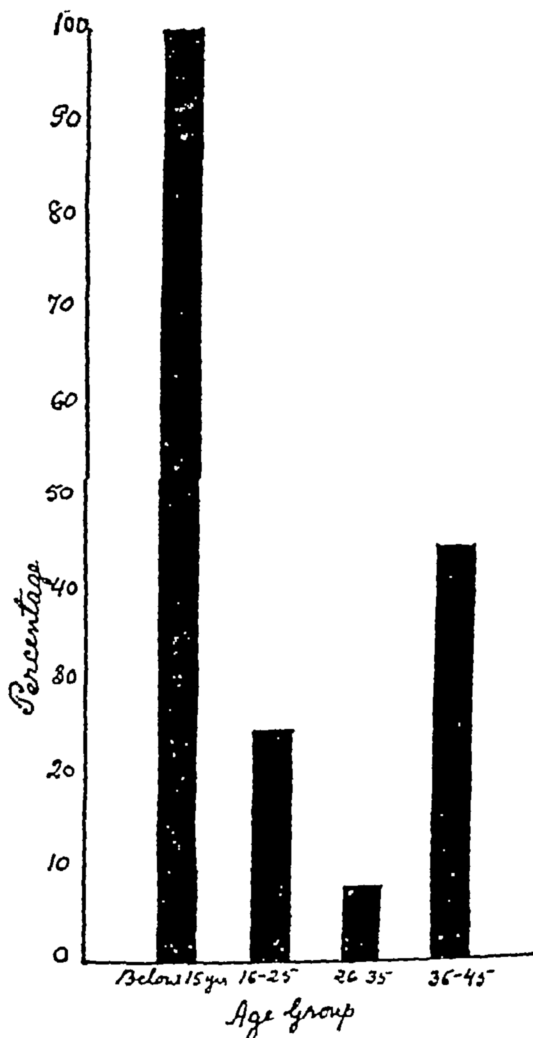
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standpoint of fertility Deviations from the normal, such as amenorrhoea, dysfunctional meno-metrorrhagia, anovular menstruation and inadequate progestational preparations of endometrium for nidation, have all been met with, which point definitely to disruption of the pituitary-ovarian-endometrial mechanism and to a low degree of fertility even in the absence of definite stigma of an existing endocrinopathy Ovulation occurred in 68% of normally menstruating cases as evidenced by the typical histological appearances of the endometrium taken out in the premenstrual phase such as tubular convolutions, subnuclear vacuolation and further coiling of the glands into a screw shape on their longitudinal axis—the section showing a characteristic serrated appearance Higher incidence of anovulatory cycle was observed in the beginning and at the end of the menstrual life (Graph II, page) So, age appears to have some relationship with the phenomenon of ovulation There is perhaps a delicate pituitary-ovary-endometrium relationship Paul Topkins, 1953, from the sterility clinic, King's Country Hospital, Brooklyn, New York, has concluded that "regularly menstruating women invariably menstruate from endometrium which is in the secretory phase of the cycle and in all probability, therefore, regularly menstruating women ovulate during each menstrual cycle Parwati K Malkani and co-workers of Lady Hardinge Medical College, New Delhi, have found an evidence of ovulation in 78 5% of regularly menstruating women

The incidence of anovulatory menstruation or non-secretory phase of endometrium was found to be 19 5% in the present series It is variable at the hands of different workers such as Mazer and Israel (1941) quote 30%, Jeffcoate (1937) 25%, Sachdeo and Sachdeo (1949-51) 36 6% as persistently an ovulatory menstruation

In the present investigation 9 cases of amenorrhoea and 4 cases of irregular menstrual cycle were found Of the 9 cases of amenorrhoea, 1 was a case of primary amenorrhoea with rudimentary uterus Out of 8 cases of secondary amenorrhoea two had tuberculous endometritis and in these cases tuberculous lesion was supposed to be the cause of amenorrhoea The patient of primary amenorrhoea did not show evidence of genital tuberculosis, as was noted by repeated endometrial biopsy One case of irregular menstrual cycle had no endometrial tissue as shown by curettings, two had persistent anovulatory cycle and one showed evidence of secretory endometrium on repeated biopsy

Fourteen cases (7%) of progesterone inadequacy were diagnosed on the basis of histological appearance alone All grades of pictures between non-secretory and secretory endometrium were seen, a few showing predominently proliferative phase while in a few cases the endometrium appeared to be predominantly in the secretory phase "It seems probable", states Bartelmez, "that all possible transition occurs between the ovular and anovular types depending on the variability in the potency of hormones and in the susceptibility of the mucous membrane in different cases" An insufficient production of progesterone by the corpus luteum

tubal occlusion was found in 23.5% of cases of sterility. This figure is very near the figures given by Sharman 26.2% and Stallworthy 22%. They later on suggested from the findings of their subsequent investigations that real tubal occlusion occurred in relatively less percentage of cases than what was thought to be before. The onus of tubal blockage has been thrown on sepsis, either acute or chronic, but in a few cases, the blockage is apparent rather than real due to utero-tubal spasm. This fact has been supported by the occurrence of pregnancy in a few cases in which insufflation test showed blockage of tubes. Again on repeated insufflation test a few cases, in which tubes were diagnosed to be blocked previously, revealed that the gas passed through them. In the present study no history of gonorrhoea was elicited due to the fact that people seldom volunteered the history of venereal diseases. Sharman states, "Gonococcus is seldom responsible for the occlusion of tubes which are not palpably thickened." Halbrecht declares that gonorrhoea is rare in Palestine although tubal occlusion is one of the main causes of sterility in his cases. In the group of secondary sterility, 19 (31%) out of 61 had blocked tubes. This clearly shows the high incidence of tubal occlusion in this group. Green-Armytage stated that tubal blockage occurred in about 29% of all cases but in only 14% of cases of primary sterility. His suggestion is that post-abortal or post-partum sepsis is responsible for much tubal damage and hence for much acquired sterility. The importance of pelvic tuberculosis as a cause of tubal occlusion has been recognised only very recently. Sharman in his analytical investigation has found tubal blockage in 61.8% of cases who had endometrial tuberculosis. Again on histological examination of these blocked tubes which he removed during operation, he confirmed tuberculosis in 12 out of 14 cases. The author has found 3 cases (50%) of tubal blockage out of 6 who had endometrial tuberculosis. Thus in view of the above findings, it seems that tubal blockage in a considerable number of cases is due to sub-clinical tuberculous salpingitis.

Hysterosalpingography has become very popular in the investigation of sterility. It has got superiority over insufflation in the fact that the site of blockage is located which is essential for doing plastic surgery on the blocked tubes. Apart from this, other pathological conditions such as, hydrosalpinx, isthmia nodosum, isthmo-spasm, kinks and tortuosities of tubes, malposition, malformations, hypoplastic and bicornuate uterus and intra-uterine tumours are all detected by this procedure. Each of these conditions might constitute a factor in infertility.

Endocrine Factor of Sterility in Female

One of the most dependable factors of fertility is the integrity of the endocrine system. The mildest endocrine disturbance affects fertility considerably. Normal menstruation, rhythmic dismantling of an oestrogen-primed and progesterone modified endometrium, as determined by premenstrual biopsy, connotes an intact endocrine system from the

cases Huhner's test in these cases repeatedly showed the presence of faintly motile or totally immotile spermatozoa in the cervical smear The husband's semen in all these cases was normal Hostility of the cervical secretion was encountered by Mclane in 16% and by Mazer and Israel in 4 8% of sterility cases Such hostility is an expression of an insufficient oestrogen influence on the cervical glands These glands, normally, at about the time of ovulation, produce copious, thin, transluscent, highly elastic, acellular glycerine like secretion which forms a favourable vehicle for the onward transmission of spermatozoa

Kurzrol -Miller Test (Invasion Test)

Kurzrok-Miller lytic test performed at mid-cycle was in confirmation with almost all post-coital test results In two cases, however, it showed negative semen mucous phase boundary test Only in rare cases one finds that the two tests do not tally A given semen specimen, morphologically normal, may be unable to penetrate a given cervical mucous, while a specimen from other male may do so This may be the potential factor in cases of relative infertility where the couples separate and subsequently remarry, each begetting with the new mate

Male Factor of Sterility

Wide experience has revealed that the husband is either partially or wholly at fault in a fairly high percentage of all sterile unions Thus Mazer and Israel have found male to be responsible in 20% and R V P Sinha mentions that the sterility was due to faults in male in 50% of married couples The author has found only 16 cases of gross seminological defects One difficulty is about the lack of unanimity on what constitutes an abnormal semen

The occurrence of pregnancy has been recorded by Russel (1954), Harvey and Jackson (1948) in cases where the husband's spermato zoa count ranged between 2 5 lacs to 39 millions per cc. One of the author's cases conceived where a sperm count in the husband was only 8 millions per cc and when reexamined after conception, it was again found to be the same

No Significant Pathology

In 14 cases (7%) in this series, and 12 2% in Roland and Simard's series, no significant pathology could be detected in either partner and thus the aetiology of sterility in these cases remained obscure Not uncommonly even the most scrupulous series of investigations one fails to detect the presence of infertility factor Many cases, though clinically and physiologically normal, do not conceive for some unknown reason It is in such cases that special endeavour should be made to find out psychogenic causes

Summary

1 Two hundred cases of sterility were investigated In 14 cases no significant pathology could be detected

is naturally reflected in an imperfectly formed pregravid endometrium which may prevent implantation of the fertilized ovum

Coital Problem

The ovum and the spermatozoa must unite within a reasonably short time after ovulation for fertilization to take place, lest they become invalid

Although the knowledge of ovulatory processes has advanced considerably, it is still not easy to predict the precise date of ovulation in any given case

The importance of timely coitus for conception to take place is well exemplified by one of the author's case who had primary sterility of 13 years and was investigated in the past by many specialists without any effect History of marital relationship revealed that she was having very infrequent sexual intercourse on account of her husband's poor health who suffered from pulmonary tuberculosis just after the marriage She was advised to resume coitus on alternate days between 13th to 15th day of her menstrual cycle The patient returned with blooming face [illegible] confirmation of her pregnancy after 4 months At the time of this [illegible] her pregnancy of 3 months [illegible] disclosed that it occurred as a result of [illegible] on the 13th day [illegible] of the pre[illegible] [illegible] the [illegible] [illegible]

[illegible]

1 Failure by a fertile mate to deposit the semen during intercourse on the portio and in the posterior vaginal fornix was detected in 4 cases Two such cases, on further enquiry, disclosed faulty position at intercourse All these patients volunteered that "semen leaked out"

2 Inadequate cervical invasion was present in 5% of the cases There are many factors which totally prevent insemination of the cervix in 7 5%, even when the husband possesses a normal degree of fertility (Mazer and Israel) Some of the cases in the present series could be explained on the mechanical basis such as the presence of viscid cervical secretion which acted as cervical plug preventing the entrance of spermatozoa into the cervical canal A pinhole poorly draining external os as seen in hypoplastic uterus, and cervical polyps were present in few other cases which usually interfere with the entrance of spermatozoa and simultaneously provoke inimical cervical discharge It was also found to be a fact that a small volume of highly concentrated semen, (less than 2 5 c c) was usually insufficient to [illegible] the acid vaginal [illegible] Many spermatozoa [illegible] [illegible] [illegible] able to [illegible] [illegible]

[illegible]

Idem (1947) Utero-Tubal Insufflation' Henry Kimpton

18 Sachdeo, S & J C (1954) Indian J M Res 42, 249-259

19 Sharman, A. Roberts, C L Walker, K Wiesner, B P and Barton M "Sterility and Impaired fertility", Hamish Haminton Medical Books London 1948

20 Sharman, A. (1947) Brit Med J 2 83

Idem (1954) Ibid. 1, 239

21 Siegler, S L. 'Fertility in Women', J B Lippincott Co 1944

22 Sinha R V P (1955) The Patna Journal of Medicine

23 Stallworthy J Walker, K Malleson J and Jackson M H Problems of Fertility in General Practice H K Lewis & Co, Ltd, 1953

24 Sutherland A M (1943) J Obst & Gynaec Brit Emp, 50 161

25 Tietze K (1933) Arch Gynec 156 35 Quoted by Sachdeo S and J C (1954) Indian J M Res, 42, 249 259

26 Wahi P N and Jain R L (1950) J Indian M A, 19 441



Fig 1
Hysterosalpingograph showing blockage of tubes at the cornual end



Fig 2
Photomicrograph of Tuberculous Endometritis

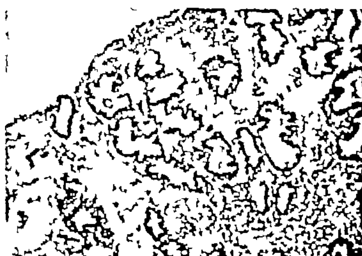


Fig 3
Photomicrograph of Secretary Endometrium.

2 Out of important factors of sterility, tubal blockage was found in 23 5% and anovulatory cycle in 19 5%
3 Tuberculous endometritis was found in 3%
4 After full investigation and treatment, 123 cases could be traced subsequently and 30 amongst them became pregnant
5 Males were responsible for sterility in 8% of cases
6 An axiom for the prognosis in a case of sterility may well be, "Don't give up the ship", for pregnancy may occur despite the most dismal outlook and in the presence of gravest genital lesion "Some marksmen require more shots to hit the target" Judgment as to the prognosis, however, should be reserved (Albert et al)

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References

1 Bartelmez, G W (1933) Contrib Embyol, 24, p 143 Quoted by Mazer, C and Israel, S L and Kacher, L (1937), Sachdeo, S and J C (1954)
2 Cary, W H (1914) Amer Jour Obstet and Gynecol, 69, 462
3 Duncon M Fecundity, Fertility and Sterility, Edinburgh A E Black, 1956 Quoted by Siegler, S L (1944)
4 Farris, E J (1946) Am J Obst & Gynec, 52, 14
5 Green-Armytage, V B (1943) Proc R Soc Med, 36, 105
6 Halbrecht, (1946) Lancet, 1, 235
7 Hartman, C G (1936) Time of Ovulation in Women, Lond
8 Huhner, M (1913) Sterility in the Male and Female, New York, Rebman Co
9 Livi, L (1935) Rev de l' inst Int de Stat, 3 380, 1935 Reviewed by Rubin I C "Utero-tubal Insufflation " Henry Kimpton, 1947
10 Malkani, Parwati, K. and Chander, Rajeni, K J Obst & Gynaec India June, 1954
11 Mazer, C and Israel, S L (1941) 'Diagnosis and Treatment of Menstrual Disorders and Sterility', Paul B Hoeber, Inc
12 Miller, E G, and Kurzrock, R (1932) Amer J Obstet Gynaec, 24, 19
13 Novak, E (1935) and Idem (1934) J A M A, 104 P 1497 Ibid 102 P 452
14 Papanicolaou, G N (1953) Am J Anat (Supp), 52, 519
15 Paul Topkins Quoted by Malkani, Patwari, K and Chander, Rajeni, K in J Obst & Gynaec of India, June, 1954
16 Randall, L M and Harrel, W E (1937) Surg Gynec & Obst, 65, 665
17 Rubin, I C (1945) Am J Obst & Gynec, 50, 628
Idem (1927) Ibid 14, 557
Idem (1940) Ibid 40, 628
Idem (1920) Jour Amer Med Asso, 74, 1017
Idem (1915) Surg Gynec & Obst 20 435

Etiology and Predisposing Factors

If the presenting foetal pole is not properly adapted to the lower uterine segment and the pelvic inlet, the umbilical cord is likely to prolapse when the membranes rupture Conditions that produce such maladaptation of the presenting part are generally presumed to be the etiological or predisposing factors of this complication There may be other contributing factors, such as proximity of the umbilical cord to the cervix, as in low implantation of the placenta and abnormally long cord More than one incriminating factors may be present in many cases

Parity

Fenton and D'Esopo (1951) did not find parity playing any part in the etiology of the prolapse of the umbilical cord As reported by Bourgeois (1941), incidence of cord prolapse in primigravidas and multigravidas was 0 41 per cent and 0 43 per cent respectively At least in his study multiparity was not proved to be an incriminating factor According to Chassar Moir (1956) though this complication is met with 5 times more often in multigravidas than in primigravidas, that is due to more multigravida confinements and parity plays no important part in the etiology

In the present study, out of 37,555 viable confinements during the period under review, 71 per cent were multigravidas and 29 per cent were primigravidas Out of 111 cases of prolapse of the umbilical cord, this occurred only 14 times in primigravidas (12 6 per cent) and 97 times in multigravidas (87 4 per cent), so the incidence of cord prolapse in the multigravidas was disproportionately higher

The actual incidence of prolapse of the umbilical cord in the multigravidas (0 37 per cent) has been found to be three times higher than that in the primigravidas (0 13 per cent) Maximum incidence of the prolapse of the umbilical cord (21 per cent) according to individual parity has been found in the grande multigravidas (para 5 and above) Rhodes (1956) also found increasing parity as a predisposing factor Importance of parity as an etiological or predisposing factor has also been stressed by Slate and Randall (1956), who found the complication nearly twice as common (0 41 per cent) in multigravidas as in primigravidas (0 25 per cent) Myles (1959) also had similar experience There had been 11 grande multigravidas in the present series, in each of whom the presenting part was vertex where no other possible or probable factors were present excepting the high presenting part Late engagement of the presenting head due to laxity of the abdominal wall and uterine musculature may be reasonably presumed to be the responsible factor in such cases Further, multiparity is more associated with other complications such as abnormal presentations and placenta praevia, which predispose to prolapse of the umbilical cord

Malpresentation

Malpresentation is probably the most important predisposing or etiological factor for this complication, to which all authors agree

Nearly 50 per cent of the cases in the present series were associated

PROLAPSE OF THE UMBILICAL CORD

(A Review of One Hundred and Eleven Consecutive Cases)

by

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and

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Prolapse of the umbilical cord, though not a very frequent occurrence, is a major obstetrical complication, as it carries with it a very high foetal loss As perinatal mortality due to other important causes has largely decreased in recent years, prolapse of the umbilical cord has assumed further relative importance as an important cause for foetal wastage

In order to find out the important factors responsible for this complication and adversely affecting the foetal prognosis, a critical analysis of 111 cases of prolapse of the umbilical cord, that were admitted or occurred in our institution from 1955 to 1959, was thought worth while

There has been much unnecessary confusion in the text-books and literature regarding the definition and degree of prolapse of the umbilical cord In our study only those cases, where the umbilical cord was seen or felt below the lower pole of the foetus, after rupture of the membranes, have been included

Material

Out of 37,555 viable confinements in our institution from 1955 through 1959, prolapse of the umbilical cord occurred in 111 cases, giving an incidence of 1 in 338 or 3 per cent Higher incidence has been reported by Chassar Moir (1956) and Myles (1959) and similar incidence has been observed by Dilworth and Ward (1957) and Fenton and D'Esopo (1951)

TABLE I

Incidence of Prolapse of Umbilical Cord

Author	No of delivery	No of prolapse of cord	Incidence percentage
Fenton and D'Esopo (1951)	60,788	216	.35
Rhodes (1956)	15,355	83	.54
Slate and Randall (1956)	15,578	63	4
Chassar Moir (1956)	—	—	67
Dilworth and Ward (1957)	19,893	66	.33
Myles (1959)	26,915	165	61
Present series	37,555	111	.3

important contributing factor

Placenta praevia was associated with 10 cases in our series, i e an incidence of 9 1 per cent

Myles (1959) found placenta praevia in 12 1 per cent of his cases, Dilworth and Ward (1957) in 6 per cent and Rhodes (1956) in 5 4 per cent

Multiple Pregnancy

Multiple pregnancy is expected to increase the risk of prolapsed cord as the presenting parts are small, engagement is delayed and also abnormal presentation is frequent.

We had only 3 such cases, an incidence of 2 7 per cent Our incidence is much lower in comparison to figures presented by other authors It was 9 per cent with Rhodes (1956) and Dilworth and Ward (1957), 10 per cent with Fenton and D'Esopo (1951) and 15 8 per cent with Myles (1959)

Contracted Pelvis or Cephalopelvic Disproportion

Pelvic abnormality or cephalopelvic disproportion was thought to be present in only 3 cases, i e an incidence of 2 7 per cent, of these 3 cases, only one was labelled as flat pelvis So this does not seem to play any important part in the etiology of prolapse of the umbilical cord in the present series This is not in agreement with other authors

Myles (1959) had 17 cases of abnormal bony pelvis, an incidence of 10 3 per cent Out of them, 11 cases were found to be cases of flat pelvis and the remaining 6 were of the generally contracted type Disproportion was thought to be present in 16 per cent of cases in the series presented by Rhodes (1956) According to Fenton and D'Esopo (1951), variations in the size and shape of the pelvis as such did not seem to be related to the etiology of this complication They did not find any disproportionately high incidence of any particular type of pelvis in their series, when compared to the average distribution of various types of pelvis

Slate and Randall (1956), on the other hand, noted much lower incidence of associated contracted pelvis in their series, which was 4 8 per cent There was only 1 case of inlet contraction out of 58 cases of Mengert and Longwell (1940) and 3 cases of funnel pelvis Funnel pelvis, they thought, was probably not involved in the etiology of prolapsed cord

Hydramnios

A sudden gush of excessive liquor may force out the loop of cord if the presenting part be free But in the experience of the present authors, who had only 1 case of hydramnios, this does not seem to play any part in the causation of the complication of prolapsed cord This experience is also shared by Cope (1951) who had only 2 cases in his series of 338 cases Dilworth and Ward (1957) had also only one case of hydramnios out of 66 On the other hand, Myles (1959) has reported an incidence of hydramnios in 8 6 per cent in his series and it was 5 per cent with Fenton and D'Esopo (1951)

Long Cord

Abnormally long umbilical cord has been blamed as a factor predisposing prolapse This has not been substantiated by most of the published

TABLE II

Presentation

Presentation	Average per cent presentation at Chittaranjan Seva Sadan during the period under review	Per cent presentation in prolapsed cords	Gross foetal mortality per cent
Vertex	95 9	49 6	60
Breech	3 1	15.3	64 7
Transverse	6	25 2	85 7
Face and brow	.3	1 8	50
Compound	1	8 1	83 9

with malpresentation or compound presentation As the percentage incidence of various presentations in association with prolapse of the umbilical cord is compared with the incidence of different presentations as a whole (Table II), it becomes evident that disproportionately larger number of cases of breech, shoulder and face-brow presentations are associated with this complication

Kurzrock, as quoted by Myles (1959), found that out of 100 cases of prolapse of the umbilical cord, 59 were associated with vertex presentation, 23 with breech presentation and 18 with transverse lie

Malpresentation was present in 57 6 per cent of cases of Fenton and D Esopo (1951)

Maximum number of cases of prolapse of the umbilical cord are always associated with vertex presentation, because vertex presentation is so extremely common (Table II) The actual risk of this complication in different presentations is shown in Table III

All the authors agree that the risk is maximum in shoulder presentation and least in vertex

Prematurity

Prematurity is rightly adjudged to be another important etiological factor Due to frequent association of malpresentation with prematurity and inadequate filling of the pelvis by the small presenting part, chances of prolapse of the umbilical cord are much increased

Our incidence of prematurity was 24 per cent It was 25 per cent with both Rhodes (1956) and Cope (1951), 28 6 per cent with Slate and Randall (1956), 29 per cent with Myles (1959), and 34 8 per cent with Dilworth and Ward (1957)

Placenta Praevia

Low implantation of the placenta is rightly considered to be another

TABLE III

Per cent Incidence of Prolapsed Cord in Different Presentations

Authors	Vertex	Breech	Shoulder
[illegible]	0.27	4.5	11 27
[illegible]	—	5.0	15-[illegible]
[illegible]	0.21	2.3	11 6
[illegible]	0.15	1.3	12 4

primigravidas was almost twice that in the multigravidas

No appreciable difference in the overall foetal loss in the primigravidas (71 4 per cent) and in the multigravidas (69 per cent) has been observed in the present study In the treatable cases, on the other hand, foetal loss has been somewhat higher in the multigravidas (Table V) Fenton and D'Esopo (1951) and Myles (1959) also had higher foetal loss in the multigravidas

It seems that primiparity contrary to previous belief does not seem to affect the foetal prognosis any more adversely than multiparity

Presentation

As in the etiology, presentation also plays an equally important role in the prognosis

Thirty-one out of 60 gross foetal deaths, as reported by Myles (1959), occurred in cephalic presentation Slate and Randall also found like Myles (1959) that foetal mortality in vertex presentation (35 3 per cent) was higher than that in breech (23 1 per cent) but lower than that in shoulder presentation (57 2 per cent)

TABLE V
Foetal Prognosis and Parity

Authors	Foetal loss per cent	
	Primigravidas	Multigravidas
Fenton and D'Esopo (1959)	29.2	38.1
Slate and Randall (1956)	40 0	43 7
Myles (1959)	24.5	31.3
Present series	42.0	49.2

TABLE VI
Foetal Mortality and Presentation

Presentations	Total no of cases	No of deaths	Foetal mortality per cent	No of salvageable cases	No of death	Foetal mortality per cent
Vertex	55	33	60 0	39	17	43.6
Breech	17	11	64 7	9	3	33.3
Shoulder	28	24	85 7	10	6	60.0
Compound	9	8	88.9	7	6	85 7
Face and brow	2	1	50.0	1	0	nil

According to Myles (1959), lower foetal mortality in the primigravidas is partly due to extended use of Caesarean section Caesarean section had been performed in his series twice as frequently in the primigravidas as in the multigravidas Foetal result was better in the primigravidas in the present series, even though none of them was delivered by Caesarean section

Our observations are somewhat different

Overall foetal mortality has been slightly higher in breech presentation than that in vertex But in the salvageable cases, much greater foetal loss has been recorded in vertex pre-

facts and figures The experience of the present authors is also similar There was no case in the present series where the cord was longer than 75 cm Average length of 55 measured prolapsed cord, in the series of Mengert and Longwell (1940) was 73 cm and it was 69 9 cm as found by Cope (1951) Myles (1959) had only 4 cases out of 165, where the length of the cord was over 75 cm

But cords were long in 2 5 per cent of the cases, as reported by Fenton and D'Esopo (1951)

We agree with Myles (1959) that long cord is not an important etiological factor If it is unusually long, there is more chance of its protruding out of the vulva, once it has prolapsed

Obstetrical Manipulations

Manual rotation of the head after displacement above the brim and artificial rupture of the membranes, specially low rupture, may cause or predispose to prolapse of the umbilical cord But there was no such case in the present series

Twenty per cent of the cases, as reported by Rhodes (1956), occurred after surgical induction of labour But, this includes induction by Krause's bougies in many cases and, further, the type of rupture of the membranes has not been mentioned Fifteen per cent of the cases reported by Fenton and D'Esopo (1951) occurred after either artificial rupture of the membranes with unengaged presenting part or attempt at manual rotation after elevation of the head above the pelvic brim

That prolapse of the umbilical cord after low amniotomy is not as common as might be expected is borne out by Bruce Eaton (1959) who had only 1 case of prolapsed cord out of 500 cases of low amniotomy

Foetal Prognosis

The overall foetal mortality in large maternity centres has been assumed to be near about 50 to 60 per cent (Chassar Moir, 1956)

There had been 77 foetal deaths in the present series, including 6 neonatal deaths, out of 111 cases, i e an incidence of 69 4 per cent That is rather high in comparison to other published figures

Prolapse of the umbilical cord was associated with 2 4 per cent of perinatal deaths in our hospital during the 5 year period under review

TABLE IV
Foetal Prognosis

Authors	Gross foetal mortality per cent
Fenton & D'Esopo (1951)	37.5
Slate & Randall (1956)	42 8
Rhodes (1956)	36 4
Dilworth & Ward (1957)	31 8
Myles (1959)	36 4
Present series	69 4

Out of 77 foetal deaths, 45 babies were dead on admission or diagnosis, leaving 66 cases only, where foetal salvage was possible The uncorrected foetal mortality in the salvageable cases was 48 5 per cent

The very unfavourable foetal prognosis in face of this complication, is due to several factors which have been analysed

Parity

Mengert and Longwell (1940) found that the foetal mortality in the

TABLE VIII

Method of Delivery and Foetal Prognosis

Methods of delivery	After full dilatation				Before full dilatation				Total
	No of cases	No of S B.	No of N D	Foetal loss per cent	No of cases	No of S B	No of N D	Foetal loss per cent	foetal loss per cent
Spontaneous	8	2	1	37.5	5	3	0	60	46.1
Internal podalic version and extraction	12	3	2	41 6	3	2	0	66 7	46 7
Reposition and spontaneous	2	0	0	0	6	5	1	100	75
Reposition and forceps	0	0	0	0	1	1	0	100	100
Forceps	6	1	0	16.7	0	0	0	0	16 7
Internal podalic version	1	1	0	100	2	2	0	100	100
Breech extraction	5	1	1	40	1	0	0	0	33 3
Bipolar podalic version	0	0	0	0	2	2	0	100	100
Bringing down a leg	0	0	0	0	1	1	0	100	100
Caesarean section	1	1	0	100	10	1	1	20	27.3

S.B = Still Birth. N D = Neonatal Death.

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Mengert and Longwell (1940) found that the foetal mortality in the

No infant was lost by Cox (1951) when delivery was immediately performed

Caesarean section needs special mention in the treatment of prolapse of the umbilical cord, as it is the only safe method of immediate delivery when the cervix is not fully dilated and immediate delivery gives best chance of survival to the baby

The use of Caesarean section has been greatly extended in the last two decades It was performed in only one case out of 58 as reported by Mengert and Longwell (1940) and in 4 cases out of 155 in Bourgeois (1941) series In some recent reports, as that of Dilworth and Ward (1957) and Myles (1959), Caesarean section has been performed in nearly 50 per cent and 22 per cent of the salvageable cases respectively with very satisfactory foetal survival

In the present series, Caesarean section was performed in 11 cases out of 66 salvageable cases (16 6 per cent) In only 1 case the cervix was fully dilated and the section was performed for disproportion When the cervix was not yet fully dilated, section was performed in 1 case for severe degree of placenta praevia with transverse lie, though the baby was grossly premature Three babies were lost including that of the case of placenta praevia, 2 being still-born and the other died neonatally Thus uncorrected foetal loss after Caesarean section was 27 3 per cent, whereas foetal mortality after vaginal delivery in salvageable cases was nearly twice (52 7 per cent) When only 20 per cent of the babies died after Caesarean section, 81 per cent of the babies were lost after vaginal delivery by any method, the cervix being incompletely dilated when treatment could be instituted Rhodes (1956) lost 90 per cent of the babies under similar circumstances Five cases of incompletely dilated cervix in his series were treated by Caesarean section, when no baby was lost

Caesarean section was performed on 32 cases out of 148 salvageable cases in the series of Myles (1959), when only 2 babies were lost (foetal loss—6 2 per cent), whereas foetal mortality was 35 2 per cent in vaginal delivery cases

Nearly 50 per cent of salvageable cases, 25 out of 54, of Dilworth and Ward (1957) had been treated by Caesarean section The foetal mortality was 12 per cent. It was nearly double (21 per cent) in the vaginal delivery group

Cope (1951) reported only 2 foetal deaths in 42 cases of incompletely dilated cervix treated by Caesarean section

No maternal mortality has been reported by any of these authors after Caesarean section for prolapse of the umbilical cord, excepting by Cope (1951), who lost 1 mother out of his 42 Caesarean section cases

Risk to the mother is little increased whereas probability of foetal survival is increased many times after Caesarean section for prolapse of the umbilical cord, where immediate vaginal delivery is not possible or safe

Comment

Prolapse of the umbilical cord takes a heavy toll of foetal life. Good many of these babies can be saved by prevention, anticipation and early detection of the complication and last-

sentation, than that in breech Foetal mortality in shoulder presentation, both overall and salvageable, has been higher than that in either vertex or breech presentation Greater foetal loss in vertex presentation than that in breech is expected as the soft and irregular breech compresses the cord less effectively than the hard head and also allows more room for the the cord to lie in the pelvis without much compression Higher foetal loss in shoulder presentation is possibly not due to the presentation itself but to the hazards of delivery in that condition

Highest foetal loss has been recorded in complex presentation, which is rather unusual Dilworth and Ward (1956) and Myles (1959) had no foetal loss in complex presentation Four out of 6 neonatal deaths in the present study occurred in this presentation vitiating the result

The number of cases with face and brow presentations is too small for any conclusion

Prematurity

When prolapse of the umbilical cord occurs in a premature baby, the prognosis of the baby is much worsened

Higher foetal mortality, both overall and salvageable, has been observed in the present analysis in the premature babies

Dilworth and Ward (1956) also found that in the salvageable cases, 91 2 per cent of the mature babies could be salvaged as opposed to only 70 per cent of the prematures As reported by Cope (1951), 37 8 per cent of the premature babies in the salvageable group died, whereas the foetal mortality in all cases of salvageable group was 28 per cent

Myles (1959), on the other hand, did not find any essential difference in the overall mortality in the two groups

Management

There were 45 intra-natal deaths before admission, leaving 66 cases for salvage

Out of these 66 babies, 26 were still-born and 6 died neonatally, resulting in 48 5 per cent uncorrected foetal mortality Condition of 7 babies out of those 32, who were lost, was very poor before any treatment could be started and none of them did survive

Where the baby was dead before treatment could be started, there was no interference excepting where it was necessary for the mother

There was no maternal mortality and no serious maternal complication did occur in any case

The result of treatment mainly depends on the method of delivery, dilatation of the cervix when the case

TABLE VII
Prematurity and Foetal Prognosis

	No of cases	Overall foetal loss per cent	No of salvageable cases	No of still birth	No of neonatal death	Foetal loss per cent
Mature babies	84	66 7	52	21	3	46 1
Premature babies	27	77 8	14	5	3	57 1

occur due to intracranial injuries caused by rapid and traumatic deliveries There had been disproportionately larger number of neonatal deaths in the present series (Table X) as well as in that of Dilworth and Ward (1957) in the immediate delivery group

The danger is more if the baby is premature

Summary

One hundred and eleven cases of prolapse of the umbilical cord that occurred or were admitted over a five year period in the Chittaranjan Seva Sadan hospital have been reviewed

Malpresentation, prematurity, multiple pregnancy, placenta praevia and multiparity are found to be important etiological or contributing factors

The overall foetal loss was 69 4 per cent and uncorrected foetal mortality in salvageable cases was 48 5 per cent

Many babies were lost as delivery was mostly delayed, where the cervix was incompletely dilated and use of Caesarean section was restricted

The place of Caesarean section has been discussed and its extended use emphasized

Some suggestions for reducing the incidence of prolapse of the umbilical cord and improving the foetal prognosis after it occurs have been made

Acknowledgment

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References

1 Bourgeois G A Am J Obst & Gyn, 41, 837, 1941
2 Chassar Moir J Munro Kerr's Operative Obstetrics 6th Ed, 1956 Bailliere, Tindall and Cox, London
3 Cope E. J Obst. & Gyn Brit. Emp, 58 259 1951
4 Cox L W Lancet, 1 561 1951
5 Dilworth E E. and Ward J V Am. J Obst. & Gyn, 73, 1088, 1957
6 Eaton B J Obst & Gyn Brit. Emp, 66, 462 1959
7 Fenton A. N and D'Esopo D A Am J Obst. & Gyn., 62, 52 1951
8 Mengert W F and Longwell F H. Am. J Obst & Gyn 40, 79, 1940
9 Myles T J M. J Obst & Gyn Brit Emp, 66, 30, 1959
10 Rhodes P Proc Roy Soc Med 49, 937, 1956
11 Slate W G & Randall J H Am J Obst. & Gyn 72 991 1956

is diagnosed or presents for treatment and the interval that elapses between occurrence of the complication and institution of the treatment The last factor is most important

The different methods of treatment with their results are tabulated in Table VIII Although the number of cases under different methods of treatment is too small for the results to be statistically significant, it is clearly suggested that foetal prognosis is relatively better after forceps delivery or breech extraction or Caesarean section than any other methods The result after reposition of the cord was highly disappointing

Craniotomy was performed in 2 cases, both on after-coming heads, one after breech extraction and the other on a hydrocephalic baby Manual dilatation was performed in one case before internal podalic version and breech extraction, the baby survived Reposition of the cord and scalp traction were performed in one case, which was subsequently delivered by caesarean section of a living baby Traction on the leg was applied in 2 cases after bipolar podalic version, in one case after reposition of the cord and in another case after internal podalic version

Foetal prognosis was one and a half times better when the cervix was fully dilated than when it was not

Fenton and D'Esopo (1951) also found much better foetal prognosis when the cervix was fully or almost fully dilated

When the delivery was immediately undertaken by appropriate methods as soon as the cord prolapsed, when the patient was in the hospital or immediately after admission, foetal mortality was nearly half than that when the delivery was delayed

Myles reported 62 9 per cent foetal mortality when the delivery was delayed, whereas only 18 6 per cent of the babies were lost when the delivery was immediately performed

By immediate delivery of the baby by forceps or breech extraction Rhodes (1956) had 70 per cent foetal survival, whereas only 30 per cent survived when the delivery was delayed

TABLE IX
Dilatation of Cervix and Foetal Prognosis

Condition of cervix	No of cases	No of live-birth	No of still birth	No of neonatal death	Foetal loss per cent
Fully dilated	35	26	9	4	37 1
Not fully dilated	31	14	17	2	61.2

TABLE X
Foetal Prognosis and Time of Delivery

Time of delivery	No of cases	No of live-birth	No of still birth	No of neo-natal death	Foetal loss per cent
Immediate	24	22	2	5	31 8
Delayed	42	18	24	1	59.5

tion and the pregnancy terminations covered in the study are given in Table 1

TABLE 1
*Pregnancy Terminations Under Study**

	Hospital	Period	Pregnancy termination
1	NW	1946-55	77279
2	CA	1946-55	46291
3	PL	1943-57	4860
4	HF	1953-56	1600

* In NW 1112 cases were excluded as the records of those cases were either missing or could not be deciphered

In CA records for the period September 51 to January 52 could not be traced

In HF earlier records were not available

It was anticipated while undertaking this study that a comparative study of the rate of congenital malformations in the four main communities in Bombay, viz Hindus, Muslims, Parsees and Christians would be of some interest In the case of CA and HF, community was entered in the hospital records PL catered to the needs of Parsees only In the NW records no mention was made about the community and a classification had to be based on their names This however, could be done with a fair degree of accuracy In addition to this, the cases at NW were analysed for possible variables, like the economic status, as well as whether the cases were booked in advance or not

(ii) *Observational Study* This study of 4909 cases was carried out at the NW Hospital by direct ascertainment of (a) 1946 consecutive pregnancy terminations during a two month period, November-December 1957, and (b) 2963 unselected cases during the period of January-September 1958

One of the authors (KJ) visited the wards at least twice a day and examined all live births and stillbirths and also all dead foetuses weighing more than one pound, for the presence of external malformations In spite of every effort not to miss any case, 1 03% of the cases in the (a) series and 1 25% in the (b) series were not available for inspection. Many of the missed cases were stillbirths or babies that expired within a few hours after birth Usually the relatives did not agree to keep the dead foetus overnight at the hospital and it had to be handed over to them before inspection In every such case, the required information was collected from the hospital staff directly responsible for the handing over of the body

Ascertainment of Malformed Cases In the retrospective study, the diagnosis was taken from the parturition records None of the four hospitals in this study used X-rays for examination or did postmortem as a routine although a few cases of internal malformations were recorded, presumably after an autopsy

In the observational study also, we had restricted to a physical examination for external malformations only Any deviation from normal was brought to the notice of one of us (A C.M) who did the clinical diagnoses The examination had to be completed within 36 hours after delivery, as a number of cases were discharged after this duration As a result, only those malformations which could be recognised soon after birth could be investigated

Observations

Classification As yet there is no

ly by prompt delivery by appropriate methods when the complication does occur

Malpresentation and prematurity are the two most important etiological factors and they are preventable to a greater or lesser extent by proper antenatal supervision and co-operation of the patients

The complication is to be anticipated in all cases where the abnormal presentation or lie persists or the presenting head remains high due to any reason All such cases should report for admission into the hospital as soon as labour pains start or the membranes rupture whichever is earlier Occasionally, a case, such as a case of unstable lie, may have to be admitted a few weeks before the expected date of confinement

An internal examination as soon as the membranes rupture in all cases in absence of any contraindication, where the prolapse of the umbilical cord is anticipated or where there is unusual alteration in the rate and character of the foetal heart sounds will detect many cases of prolapse of the umbilical cord sufficiently early

Asphyxia birth injuries and prematurity are the chief causes of death How long the baby can withstand pressure on the cord is a moot question But if the baby is to be saved it has to be delivered immediately Reposition of the cord Braxton-Hick's version and such other methods should be completely abandoned If the cervix is completely dilated and the presenting part is low vaginal delivery by appropriate method is to be undertaken Where the conditions are not safe or suitable for immediate vaginal delivery, Caesarean section should be unhesitatingly performed if the baby has a reasonable chance of survival

Recent authors like Rhodes (1956) and Dilworth and Ward (1957) feel that Caesarean section should be performed in nearly all cases where the cervix is not fully dilated The present authors also share the same view The objection against extended use of Caesarean section is the increased risk of operating on a hurriedly prepared patient The improved method of anaesthesia and post-operative care as also antibiotics and chemotherapeutic drugs should overcome this objection It goes without saying that no extra risk on the mother should ever be taken if the chances of survival of the baby are not reasonably good

Importance of adjunctive measures, while the preparation for Caesarean section is going on, has been stressed by Dilworth and Ward (1957) Replacement of the prolapsed cord in the vagina, relieving of pressure on the cord by manual elevation of the presenting part and postural treatment and oxygen inhalation to the mother will be of much help

The importance of the state of dilatation of the cervix regarding the foetal prognosis has been much reduced due to the extended use of Caesarean section Actually more babies were saved (88 per cent) by Dilworth and Ward (1956) where the cervix was incompletely dilated than when the dilatation was complete (79 per cent) This was because of the fact that 24 out of 25 cases of incomplete dilatation of the cervix were treated by Caesarean section

Some neonatal deaths are liable to

A STUDY OF CONGENITAL MALFORMATIONS IN BOMBAY

by

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Introduction

The changes in the disease pattern due to a large scale control of infectious diseases of infancy and childhood, and the effect of radiation on pregnancy terminations are shifting the attention of workers to congenital malformations The clinician has now an added interest because of the increased scope of surgery Our knowledge of the aetiology of congenital malformations is still very elusive and as Neel (1958) has recently pointed out for almost 80% of these cases, we have no clue whatsoever about their causation In view of this comparative teratology becomes one of the important approaches to a study of this problem and it was considered that factual material from India would constitute a useful contribution to the subject The present study deals with data on congenital malformations collected from several maternity hospitals in Bombay and discusses their scope and limitations

Material

Source In absence of a general registration of malformed cases, the source which can provide some reliable data on their incidence is the maternity hospitals Bombay being a metropolitan city with congested living conditions, the population at all levels avails itself of the facilities provided by these hospitals The following four hospitals were chosen for this study to represent a large section of city population and of different communities residing in it

(i) Nowrosjee Wadia Maternity Hospital (NW) It is a large maternity hospital, situated in an industrial area, where a big majority of admissions belong to the Hindu Community

(ii) Cama & Albless Hospitals (CA) Another fairly large maternity hospital situated near a Muslim area

(iii) Parsee Lying-in Hospital (PL) A general hospital with a maternity section used exclusively by the Parsees

(iv) Holy Family Hospital (HF) A hospital with largely Christian attendance

Mode of Collection The material was collected in two ways as follows

(i) *Retrospective Study* The informations were collected by a perusal of the records of the four hospitals mentioned above The dura-

Frequency of Occurrence In the retrospective study it was found that there was no uniform method or rigorous standard of classifying stillbirths and abortions in the four hospitals This information was essential for obtaining an accurate estimate of the frequency of malformations based on pregnancy terminations *excluding abortions* In NW, CA and HF the attending women were largely illiterate and accurate information regarding gestation period could not be elicited from them In the case of PL, 28 weeks of gestation period was used as a line of demarcation with a fair amount of accuracy In NW, it was possible to go over all the recorded *stillbirths and reclassify them on* the basis of their weight a foetus weighing less than 1,000 gms being taken as an abortion or a nonviable

Table 3 gives separately the number of malformations for single and multiple births, nonviables and cases where no information was available about the birth status In NW and NWO series, the incidence of malformations compiled on the basis of single births does not differ significantly from that based on other than *single births* (X^2=0.87 d f 1, X^2=0.16 d f 1 respectively) Therefore the crude incidence rates based on the total pregnancy terminations have been used for comparative purposes instead of those based on single births Rates of malformation per 100 pregnancy terminations for the retrospective studies and the observational study are given in Table 4 By *comparing the rate of 1.20 in the* observational study with 0.44 in the retrospective study in NW hospital it becomes quite evident that there is

TABLE 3
Frequency of Malformed in Different Type of Births

	NW		NWO	
	Total	Malformed	Total	Malformed
Total pregnancy terminations	77270	343	4900	59
Single births	69080	[illegible]12	4328	53
Multiple births	835	3	54	17
Nonviables (abortions)	7017	18	525	6
No information available about birth status	347	10	2	-
X^2 Single births x others		0.89		0.16

TABLE 4
Frequency of Malformations

Hospital	Pregnancy terminations	No malformed	Rate per 100 pregnancy termination
NW	77279	343	0.44
CA	46201	151	0.32
PL	4800	27	0.[illegible]
HF	1600	9	0.5[illegible]
NWO	4900	59	1.20

satisfactory or standardised classification of congenital anomalies In the present paper we have followed the procedure adopted by Neel (1958) of taking the malformed child as the unit of classification (i e whatever the number of malformations the child is scored only once) and grouping them in the following categories

I Those with single malformation or malformations confined to one system

II Those with multiple defects involving several systems

III Those with complex malformations or ill defined states

A detailed listing of all the recorded malformations in each of the four hospitals studied is given in Table 2 Malformations encountered by us during the observational study are listed under NWO and the corresponding recorded series under NWR in the same table

TABLE 2

Type of Malformations Occurring in various Hospitals Under Study

		NWO	NWR	NW	CA	PL	HF
I	Single malformations and malformations confined to one system						
A	Musculoskeletal system						
	Club foot (all types)	5+1*	2	50	10+1*	5	3+1*
	Club hand (Madelungs deformity)	1	-	-	-	-	-
	Dislocation of the knee	-	-	-	-	1	-
	Maldevelopment of hand or feet	5	7	-	-	-	-
	Polydactyly	6	1	-	-	-	-
B	Respiratory system	-	-	-	-	-	-
C	Cardiovascular system						
	Congenital heart disease (type unspecified)	-	-	-	-	3	-
D	Hemic and lymphatic system	-	-	-	-	-	-
E	Digestive system						
	Atresia ani	3	3	11	2	1	-
	Harelip	8	6	19	3	-	-
	Harelip and cleft palate	3	3	35	9	-	1*
	Cleft palate	-	2?	5	4	-	1
	Atresia ani with harelip	-	-	1	1	-	-
	Atresia ani with cleft palate	-	-	-	1	-	-
	Congenital obliteration of bile duct	-	-	-	-	1	-
	Exomphalos	1	2	7	1	-	-
F	Urogenital system						
	Hypospadias	-	-	3	-	-	-
	Undescended testes	1	1	1	-	-	-
G	Nervous system						
	Anencephaly only	1	5	63	41	4	2

degree of neglect in these records In the case of harelip and cleft palate there is a state of underrecording and also there appears to be a tendency to include 'only harelip' cases in the 'harelip and cleft palate' group

Nervous system malformations in all the hospitals have better recordings compared to other malformations Particularly, anencephaly seems to be having completeness in recording

As far as the multiple malformations are concerned the observation we made earlier about lack of precision perhaps holds true for all the hospitals

In the NW series there was a significant difference ($X^2=5\,47$ d f 1, $P < 05$) between the rate of malformations based on single births and that based on nonviable cases However, in the NWO series there was no significant difference shown for this comparision It appeared from this that the underrecording was of greater magnitude in the nonviable cases

It may also be pointed out that, in the NW Hospital, the recordings improved during the observational study (0 96) as compared with the retrospective study (0 44)

In view of these limitations only variables which are not likely to be affected by these factors will be considered in some detail

Malformations in Relation to Pregnancy Registration and Economic Status In the NW series, it was possible to evaluate the effect of these two variables on the rate of malformation Of the cases registered in the antenatal clinic, about 60% turned up for confinement It is likely that a large proportion of the remaining went to their villages for the event On the other hand, about 10% of the women were admitted for confinement without previous registration during the year 1955 and this figure rose to 18% in 1957-58 during the observational study There was no indication of a difference in the rate of malformation in the registered and emergency series (Tables 5 (i) and 5 (ii))

The NW hospital has a few paying beds in addition to a large number of free beds This provided a simple criterion to examine the effect, if any, of economic status on the rate of malformations Both the retrospective study and the observational study at NW did not show any significant difference in the incidence of malforma-

TABLE 5 (i)

Condition at Birth in Registered and Emergency Cases

	NW (1955)		NWO	
	Registered	Emergency	Registered	Emergency
Live births	7038	319	3729	451
Stillbirths	226	55	93	55
Nonviables (abortions)	384	426	151	374
Multiple births	96	7	43	11
No information about birth status	13	20	-	2
Total	7757	827	4016	893

		NWO	NWR	NW	CA	PL	HF
	with meningocele, very short limbs probably other defects also present, severe maceration	1	-	-	-	-	-
	with harelip and clubfoot	-	-	-	1	-	-
	Microcephaly and clubfoot	-	-	-	1	-	-
	Iniencephaly						
	with harelip and cleft palate	1	-	-	-	-	-
	with cleft palate, ?clubfoot, webbed finger	1	-	-	-	-	-
	Encephalocele and super numerary digits	-	-	2	-	-	-
	Harelip with clubfoot	-	-	1	-	-	-
	Atresia ani						
	with clubfoot	1	1	-	-	-	-
	with deformed limbs	-	-	1	-	-	-
	with hypospadias	-	-	1	-	-	-
	with cleft palate, exomphalos ?sex, nondescent of testes, legs hyperextended from knee left drop	-	-	-	-	1	-
	with meningocele	-	-	-	1	-	-
	Exomphalos						
	with clubfoot, partial cleft palate	1	-	-	-	-	-
	with clubfoot	1	-	-	-	-	-
	Undeveloped leg and scrotum	1	1	-	-	-	-
	Deformity of liver and spleen lumps felt all over the body limbs deformed	-	-	-	-	1	-
	Absence of anterior abdominal wall deformity of legs, ?sex	-	-	-	-	1	-
III	Complex malformations						
	Thorocopagus (one head, two bodies)	-	-	-	1	-	-
IV	Syndromes						
	Achondroplasia	-	-	1	1	-	-
	Albino	1	-	-	-	-	-
	?Epispadias Mongol	-	1	-	-	-	-
V	Ill-defined states						
	Tumour mouth type undetermined	1	1	-	-	-	-
	Monsters	-	3	42+2*	4+1*	-	-
	Monster, cleft palate, clubfoot	-	-	1	-	-	-
	Monster, vasico vaginal fistula	-	-	1	-	-	-
	Absence of ossification centers	-	-	-	1	-	-
Total malformed in single births		59	47	340	146	27	7
Total malformed in multiple births		?1	-	3	5	-	2
Grand total		59	47	343	151	27	9
Total pregnancy terminations		4909	4909	77279	46291	4860	1600

* All cases irrespective of whether it is a live or stillbirth or an borted foetus have been recorded

Malformation in multiple births are given with an asterick

TABLE 7 (i)

Congenital Malformations in Different Communities

	Hindus			Muslims			Christians		
	Total pregnancy terminations	No	Percentage	Total pregnancy terminations	No	Percentage	Total pregnancy terminations	No.	Percentage
NW	65819	293	0 44	2599	19	0 73	8668	29	0.33
NWO	4176	46	1 10	211	5	2.37	498	8	1.61
CA	24348	81	0.33	15081	57	0.38	6181	10	0 16
Total	94343	420	0 44	17891	81	0.48	15347	47	0.31
HF	136	2	1.47	100	-	-	1318	7	0.50

TABLE 7 (ii)

Anencephaly in Different Communities

	Hindus			Muslims			Christians		
	Total pregnancy terminations	Anencephaly No	Anencephaly Percentage	Total pregnancy terminations	Anencephaly No	Anencephaly Percentage	Total pregnancy terminations	Anencephaly No	Anencephaly Percentage
NW	65819	63	0.096	2599	5	0 192	8668	2	0 023
NWO	4176	4	0 096	211	1	0.474	498	-	-
CA	24348	25	0.102	15081	21	0.139	6181	2	0.032
Total	91343	92	0 098	17891	27	0.151	15347	4	0 026
HF	136	-		100	-	-	1318	2	0 151

PL Parsees Total pregnancy terminations 4860· Anencephaly 5 Rate 0.10 per cent

a gross underrecording of malformations In view of this it is necessary to examine the hospital recordings during the observational period in some detail

An appraisal of the hospital recording during the observational period In the observational study, as the ascertainment was done independently of hospital records, it was possible to make a critical appraisal of the hospital recordings

We shall consider the recordings in each group in Table 2 separately In the musculoskeletal system (A in Table 2) in general, there is a vagueness in recording For instance, one case of clubfoot and one case of clubhand were vaguely recorded as maldevelopment of hand or feet Also 3 clubfoot cases and 5 out of 6 polydactyly cases were not recorded at all

In the digestive system there was some underrecording, one out of the 3 harelip and cleft palate cases was not recorded probably because it occurred in a stillbirth case There was some over-recording too One harelip case was recorded as harelip and cleft palate and 2 normal cases were recorded as doubtful cleft palate cases

It was observed that in the case of nervous system malformations in most of the cases the defect was recorded though not in detail All the 5 cases of anencephaly that occurred were recorded as 'anencephalic monster' irrespective of whether it occurred by itself or associated with malformations of the same system or different system Even so anencephaly was mentioned whenever present and as far as the incidence of anencephaly is concerned the recordings were quite complete We can therefore, assign a high observational value to this defect

Excluding the 2 cases of spina bifida with anencephaly out of the 9 cases of spina bifida, only 5 were recorded In 4 of the 5 cases recorded there was lack of precision in the recording of the associated malformations

Out of the 5 hydrocephaly cases 4 were recorded The one case which was not recorded was a very likely hydrocephaly case but had severe maceration

Multiple malformations were most poorly recorded In most of the cases only the major defect was recorded and all other associated defects were not mentioned On the other hand, when mention was made of the associated defect many a time, there was a lack of precision

Complex malformation in the recorded series were mostly monsters Out of the 3 monsters, it was observed 2 were iniencephalies with associated malformations and one was a severely macerated foetus with no sign of any external malformation

Limitations of Retrospective Study In the first group excepting some recordings of clubfoot, there is hardly any data on any other malformation from other hospitals This indicates the extent of neglect in the recording of musculoskeletal malformations Even clubfoot seems to be underrecorded

Atresia ani which had a complete recording in the observational series seems to be underrecorded in all the hospitals This is surprising in view of the fact that most of the affected babies would be handed over to the pediatric service for an immediate operation and an underrecording of this malformation indicates the

TABLE 8

Malformations in Multiple Births

Hospital	Total births	Twin births	Malformed pair: One member	Sex	Condition at birth	Other member	Sex	Condition at birth
NW	77279	835	1 Monster	?	—	Normal	F	Living
			2 Monster			Normal		—
			(One of triplets)	F	—	Normal	F	—
			3 Hydrocephalus	M	Stillbirth	Normal	F	Stillbirth
CA	46291		1 Hydrocephaly	F	Stillbirth	Normal	F	Living
			2 Hydrocephaly & cleft palate	M	?	Normal	M	?
			3 Hydrocephaly	M	Stillbirth	Normal	F	?
			4 Amorphous monster	?	Stillbirth	Normal	F	Living
			5 Clubfoot	M	Living	Normal	Not recorded	S.B
PL	4552	60	Nil					
HF	1600		1 Harelip & cleft palate	M	Living	Normal	F	Living
			2 Clubfoot	F	Living	Normal	F	Living
NWO	4909	54	1 Clubfoot	M	Living	Normal	M	Living

TABLE 5 (ii)

Frequency of Congenital Malformations in Registered and Emergency Cases

	NW single births			NWO single births		
	Registered	Emergency	Total	Registered	Emergency	Total
Non-malformed	7223	371	7594	3775	500	4275
Malformed	41	3	44	47	6	53
Total	7264	374	7638	3822	506	4328
	$X^2 = 0.35$ 1 d f			$X^2 = 0.01$ 1 d f		
	NW total births			NWO total births		
Non-malformed	7716	824	8540	3965	885	4850
Malformed	41	3	44	51	8	59
Total	7757	827	8584	4016	893	4909
	$X^2 = 0.26$ 1 d f			$X^2 = 0.86$ 1 d.f		

TABLE 6

Congenital Malformations in Paying and Non-paying Patients

	NW			NWO		
	Paying	Free	Total	Paying	Free	Total
Non-malformed	7635	69301	76936	401	4449	4850
Malformed	29	314	343	3	56	59
Total	7664	69615	77279	404	4505	4909
	$X^2 = 0.82$ 1 d.f			$X^2 = 0.42$ 1 d.f		

tions in the two economic groups (Table 6)

Community Table 7 (i) contains the data of NW, NWO and CA series analysed according to communities

There was a significantly higher rate of malformations in the Muslims than in Hindus in the NW series ($X^2=4.5$ d f 1 $P < 0.05$) and a similar trend was observed in the NWO series This difference, however, was not observed in the CA data The rate amongst the Christians was lowest in the NW and the CA series, although not so in the small NWO series and the HF series

We can here consider anencephaly in some detail because of its high observational value Table 7 (ii) gives a comparison of the incidence of anencephaly for the different communities in the different series In the case of Hindus it is extremely likely that there is heterogeneity in the groups that attend these two hospitals It is interesting to note that in spite of it, the incidence of anencephaly is similar in both these hospitals The three series, viz NW, NWO and CA, were combined and it was found that there was a significant difference in the incidence of anencephaly in Hindus and Muslims (X^2_{HM})=4.05 d f 1 $P < .05$), Hindus and Christians (X^2_{HC}) =6.91 d f 1 $P < 0.01$) and in Muslims and Christians (X^2_{MC}) =12.51 d f 1, $P < 0.01$) The Christians have a very low incidence in NW and CA

have studied only live births Our series cannot be compared with any of these The other commonly adopted method is to study the hospital records as we have done We have already mentioned on the strength of the comparison between malformations in booked and emergency cases that there does not appear to be any bias in the clinical data A similar observation was made by Neel on the basis of agreement between the Japanese series collected by the ABCC and the series collected by Mitani (1943) from Tokyo Redcross Maternity Hospital Consequently one can consider the hospital series to be fairly representative of the population

We will here consider some of the studies that are comparable to ours Book (1951) in a study of South Sweedish population examined records of a period of 20 years and found in 44109 births an overall rate of 1 34 per 100 pregnancy terminations, Carter (1950) reported from a study of 14813 cases from the antenatal records of Queen Charlotte's Hospital London, an overall rate of 1 5% Newton and McLean (1947) reported a rate of 0 84 per cent for USA Neel finds for the Japanese series an overall rate of 1 02 per cent It will be observed that our observational rate of 1 20 per cent compares fairly well with all these series

It is possible to compare our series with the Japanese series in a little more detail The observed malformations rate for the musculoskeletal system and digestive system are similar to the Japanese rates whereas there seems to be a preponderance of nervous system malformation and multiple malformations in NWO series In our study, it was not possible to consider cardiovascular system malformations due to various difficulties Excluding this group from the Japanese series gives a rate of 0 89 Compared to this rate our rate of 1 20 is high (X^2=5 2 d f 1 P $<$0 05)

In general, it appeared that Muslims had a higher rate of congenital malformations as compared to Hindus and Christians were the least affected

Due to the high observational value of anencephaly the low rate observed for anencephaly in Christians in both NW and CA was of great interest With a view to substantiate or contradict this result an independent series of Christians was collected (HF) But this series showed that the rate for Christians was not significantly different from that of Hindus or Muslims (X^2_{CH} =0 04 d.f 1, X^2_{CM} =0 13 d f 1) It is possible that the Christians attending the two hospitals are different and it would be interesting to study these groups in greater detail

In the case of anencephaly, it was of interest to find the usual preponderance of females (Table 10)

Rate of Malformations (per 100) in Different Systems

	A	B	C	D	E	F	G	H	I	J	II	III	0 02	0 00
Neel	0 32	0 00	0 14	0 01	0 26	0 01	0 10	0 04	0 02	0 01	0 08	0 01	IV	V
NWO	0 35	0 00	0 00	0 00	0 30	0 02	0 22	0 02	0 00	0 00	0 24	0 00	0 02	0 02

TABLE 9

Data on Consanguinity

Frequency (in percentage) of consanguinity

	Total	Uncle-niece		First cousin		First cousin once removed		Second cousin		Others & not defined		Total	
		No	Freq	No	Freq	No	Freq	No	Freq	No	Freq	No	Freq
Malformed	59	-	-	6	10 2	1	1 7	1	1 7	1	1 7	9	15 3
Non-malformed	1919	2	0 1	225	11 7	20	1 0	38	1 9	16	0 8	301	15 7

Malformed cases are from series (a) and (b)
Non-malformed cases are from series (a) only

Detailed Information of Malformed Consanguineous Cases

	Malformation	Community	Degree
1	Anencephaly bilateral complete harelip, cleft palate, polydactyly scrotum & penis not developed undescended testis, kidney tumour?	M	1st cousin
		HD	2nd cousin
2	Hydrocephalus	C	1st cousin
3	Spinabifida	HO	1st cousin once removed
4	Iniencephaly & cleft palate, webbing of fingers?	HD	1st cousin
5	Hydrocephalus	HD	1st cousin
6	Hydrocephalus with spinabifida, meningomyelocele & clubfoot	HD	1st cousin
7	Examphalos	C	1st cousin
8	Harelip and cleft palate	M	? (uncooperative)
9	Absence of fingers		

HD — Hindu Deccani, HO — Hindu others, M — Muslims, C — Christians

DYSPAREUNIA FOLLOWING VAGINAL OPERATIONS

by

M D ADATIA, M.D , F C P S

In recent times, vaginal operations are getting more common as the surgical technique is rapidly advancing A detailed and a thorough follow-up is necessary to find if dyspareunia is present, following any of these operations The interest has increased as some cases have been reported where dyspareunia has become incurable and ruined their entire marital happiness

Foul discharge or bleeding can be easily noted by the patient Improper healing can be made out by speculum examination but difficulties in cohabitation cannot be made out unless specifically inquired for Women themselves very rarely complain about it unless a direct question is asked for

Causation of Dyspareunia

Uneven apposition and non-obliteration of spaces lead to collection of serum and blood under the repaired mucosa Collection of blood forms hematoma which leads to easy infection and dysruption of apposed surfaces Infected areas cause delayed healing and give rise to uneven fibrous tissue formation which become painful on stretching

Perineal repair is a common procedure after labour In the absence of prophylactic episiotomy, irregular and ragged lacerations of perineum take place which prolong the healing process and give a painful scar even though proper repair is done with sufficient care

Often wide mucosa is excised to narrow the upper, lower and lateral vaginal walls for repair of cystocele and rectocele This subsequently narrows the introitus and several times results in dyspareunia

Pedical stumps in vaginal hysterectomy are joined together to form a large size lump at the vault, which narrows the top and causes painful cohabitation

The posterior commisure or the fourchette is the most vulnerable site for tenderness Improper repair of mucosa there without specific subcuticular lock suture (Te Linde) continued to the perineum gives painful and unhealthy scar formation

Comments

Vaginal wall needs extra care during repair as it has to undergo frequent stretching and straining during cohabitation.

Subcuticular repair of perineum brings smooth healing and prevents pain while sitting and squatting Proper repair of posterior commissure with a subcuticular lock suture would not cause dyspareunia

For cases of prolapse of uterus, thought should be given to every individual for selecting the correct method of repair or the type of operation (Brutar) During marital life defective operative trauma to the

TABLE 10

Sex Distribution in Anencephalic Cases

	Males	Females	Sex?	Total
Anencephaly				
(i) NW	18	51	1	70
(ii) NWO	3	2	-	5
(iii) CA	13	31	5	49

This work is of an exploratory nature It is obvious that for any reliable conclusion one can hardly make use of the material available at present In future, we hope, the hospitals do give more thought and time to maintain better records The value of such records can not be overemphasized

We are deeply grateful to Dr K M Masani, Principal Medical Officer of Nowrosjee Wadia Maternity Hospital for providing us every facility to carry out this work We thank the Medical Officer, Cama and Albless Hospital, and the Chief Medical Officers of Parsi Lying-in Hospital and of Holy Family Hospital for their kind consent to go over the hospital records Thanks are also due to the staff of all these hospitals and to Mr J J Pinto who helped us in the perusal of the records and in the preparation of this paper

References

1 Book J A Acta Genet., 2, 289-311, 1951
2 Carter C O J Obst. Gyn Brit Emp , 57, 897, 1950 (abstracted in Brit J Soc Mew)
3 Harris L E & Steinberg A G Pediatrics, 14, 314-326, 1954
4 Manual of the International Classification of Diseases Vol 7
5 Martin W J Brit Med J , 1, 438, 1949
6 Murphy D P Congenital Malformations J B Lippincott, 1947
7 Neel J V Am J Hum Genet , 10, 398-445, 1958
8 Potter E R & Dickmann W J Am J Obst Gynaec , 56, 593, 1948
9 Record R G & Mckeown T Brit J Soc Med , 4, 183-213, 1949
10 Sanghvi L D , Varde D S & Master H R Acta Genet, Stat Med , 6, 41-49, 1956
11 Sanghvi L D , Master P A , Rehman Y A & Master H R. Incidence of twins in Bombay (Unpublished data)

vagina may bring untold miseries to the couple, if proper care is not taken

Making very narrow introitus during plastic vaginal repair and allowing only one finger to be introduced inside to give a nulliparous feeling during cohabitation is an incorrect technique and would give rise to dyspareunia The introitus should always allow two fingers to be introduced inside Sometimes underlying psychogenic focus may flare up due to operative trauma

The pubococcygeus muscle is essential for sexual function and satisfaction during cohabitation And that function can be improved only by correct suturing of torn and lacerated muscles and fascia and not by shortening the mucosa and narrowing the introitus It is now a known fact that the pubococcygeus muscle maintains the tone and the active functions of all the lower pelvic viscera situated in pelvic cellular tissues The supportive function of the musculo-fascial tissue is acquired by the time the child assumes erect posture, while the sexual perception centred in the peri-vaginal tissues is developed during adult or married life This sensory perception of vagina undergoes rapid and marked changes due to psychic factors, repair surgery, child-birth, etc (Adatia), and unless proper care is taken to prepare a correct pubococygeus sling, the function would not be satisfactory

In vaginal hysterectomy, the vaginal vault should be sufficiently lifted up by preparing a sling of neatly isolated uterosacral and ovarian ligaments and stitched at the outer angles of the peritoneal opening Vagina should not be completely closed by continuous suturing but should be repaired by interrupted sutures which would allow satisfactory drainage and avoid collection of blood in the retroperitoneal space, that would form tender areas afterwards

In the older age group, for treatment of complete prolapse of uterus along with vaginal hysterectomy often partial colpocleisis is done to prevent vault prolapse This would result in painful cohabitation and dissatisfy them in sexual life

Recent interest in geriatrics has shown that in women even after the age of 70 years sexual interest has been maintained in several cases (Newman & Nichols) Undertaking a Leforte's operation even with the present modification of keeping a lateral gutter would not minimize the difficulties of cohabitation

Clinical Impression

It is difficult to get accurate figures as complete follow-up and inquiry for cohabitation was not made with every one But the general impression is that at least 2 to 3 out of 10 patients complained of pain and tenderness after vaginal operations

Perineal repair was understood as a frightful procedure by several women as they feared pain while squatting and during cohabitation Some had developed definite tender nodules, which required local hyalase and Novocaine injections for relief Linen threads used for vaginal operations often caused sepsis and extreme tenderness at the site of sinus formation

Post-partum dyspareunia was very commonly observed, particularly when perineal or lateral vaginal trauma was repaired

a day for 7 to 10 days Subjective symptoms and local condition were noted in all cases A further course of treatment for one week was given to patients who did not have symptomatic relief Reculture was done after 4 to 5 days after the completion of the treatment It was done only in 28 cases as the other patients did not turn up again for the follow-up Patients were also observed for any toxic effects of the drug

Observations

Candida albicans was the causative organism in 29 cases, in five *C tropicalis* was isolated, and in one *C pseudotropicalis* was found Three patients were pregnant and none of the cases was diabetic Varying degree of pruritus was complained of by all the cases The lesions were primarily in the vagina and none had vulvitis nor excoriation of the vulva

Symptomatic cure was obtained in 28 cases by 7 to 10 days of treatment, and in the rest of the cases by the 15th day of the treatment Mycological follow-up revealed that cultures in 26 cases became negative by 12th to 15th day No case of relapse was noted in the series

---

Total no of cases 35
Symptomatic cure (1) 28 cases by 7-10 days, (2) all cases by 15th day
Follow-up 28 cases
Mycological cure 28 cases by 12 to 15 days

No attempt was made to compare the efficacy of this antibiotic with others It was observed that the patients had considerable relief of symptoms within first two days of application of the drug No side effects of the drug were noted during the course of treatment

Summary and Conclusions

1 Thirty-five cases of vaginal moniliasis treated with antifungal antibiotic Hamycin were studied
2 In 28 cases symptomatic cure was obtained by 7 to 10 days and in all cases by 15th day
3 Mycological cure was obtained in 26 of the 28 cases, that were followed-up, by 12 to 15 days
4 The drug was found to be safe and no side-effects were noticed
5 Hamycin was found to be very effective in the treatment of vaginal Moniliasis

Acknowledgments

We are very thankful to the authorities of Hindustan Antibiotics Ltd, Pimpri, for making us available Hamycin in liberal quantity for this clinical trial

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References

1 Riddell R W and Stewart G T Fungous Diseases and Their Treatment 1958 Butterworth & Co (Publishers) Ltd London
2 Taschdjian Claire L Mycologia XLIX 1957
3 Thirumalachar M J, Gokhale B B and Padhye A A Nature (In press)

HAMYCIN IN THE TREATMENT OF VAGINAL MONILIASIS

(Preliminary Observations)

by

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Hamycin is an antifungal antibiotic recently developed at Hindustan Antibiotics Research Centre, Pimpri It is a polyene antibiotic belonging to the group heptaene It is produced by one of the *Streptomyces species*, *Streptomyces pimprina* Thirum , a new species of mould isolated from soil in Pimpri The In vitro spectrum of the antibiotic showed a remarkable activity against the yeast group of fungi particularly *Candida albicans* It was found to be effective even at as low concentrations as one in 100 million parts (Thirumalachar et al 1960) The results of 35 cases of leucorrhoea caused by vaginal moniliasis treated with Hamycin are presented in this paper

Material and Methods

Thirty-five cases of leucorrhoea caused by vaginal moniliasis were taken up for the study Cases of leucorrhoea due to other causes like *Trichomonas* infection and cervicitis were excluded, as it was the primary intention to see the effect of the drug in unmixed infection of Candidiasis

The diagnosis in all cases was confirmed both microscopically and by the artificial culture of the causative organism The cultures were done on Sabouraud — cycloheximide — chloramphenicol medium Isolation and identification of Candida species was done by sugar fermentation and assimilation tests Corn-meal-agar was used in place of Nickerson's medium for chlamydospore formation, as it has been pointed out that other fungi like *Geotrichum* and also some bacteria give dark coloured growths similar to *Candida* growth on Nickerson's medium (Taschjian 1957)

Patients were treated with local application of Hamycin (0 1% glycerine suspension) with a sterile cotton swab The drug was applied twice



Fig 1

fashioned from the anterior rectus sheath in such a way that they remained attached at their lower ends In the meantime vaginally a longitudinal incision about one inch in length was made on the anterior vaginal wall starting from a point about ½ inch below the external urethral orifice, the two flaps of vaginal skin were reflected With the aid of the fingers dissection was completed no evidence of urethral bulb was noticed Apparently no urethral tube existed. Subsequently the musculo fascial layer laterally and posteriorly, constituted by the pubo-cervicalis the fused vaginal and vesical fascia and the fascia of the post-urethral ligament was mobilised and by means of investing stitches buttressed to form the lower portion of the bladder into a tubular channel so that it might act as a substitute for the urethra (Fig 2)

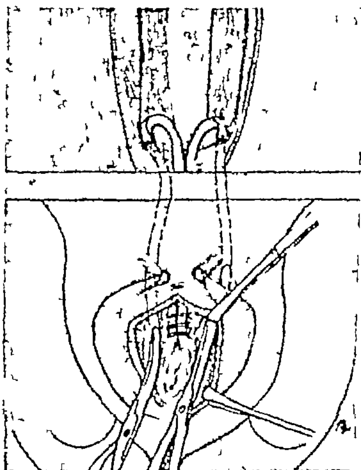


Fig 2

The inner fibres of the pubo coccygeus muscle on each side were also brought together in the midline to provide further reinforcement Through the abdominal incision the fingers were inserted into the cave of Retzins till they met the vaginal fingers on the lateral side and a groove was thus made. Through the channels thus created the fascial strips prepared from the rectus sheath were brought down with the help of long curved forceps passed up from below The strips were made to cross behind the newly formed urethra where they were stitched to each other while the free ends were taken anteriorly and stitched to the post urethral ligament (Fig 3)

SURGICAL MANAGEMENT OF CONGENITAL URINARY INCONTINENCE IN THE FEMALE

by

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An interesting case of bifid clitoris with congenital urinary incontinence consulted us and it was deemed worth putting on record in the literature

Case Report

L D a 14 year old Hindu girl, first attended our private clinic with the complaint of dribbling of urine from birth The dribbling was continuous occurring throughout the day and night She had not yet had her menarche

Her general health was satisfactory On abdominal examination nothing abnormal could be detected Examination of the external genitalia revealed a uniform distribution of hair growth over the mons veneris The clitoris was double and each labium minus was seen to curl round the clitoris of its own side (Fig 1) The rest of the external genitalia was normally formed Urine was seen to dribble from the site which normally is that of the external urethral orifice This produced excoriation of the vulval area On introducing a rubber catheter into the bladder no urine came out The cervix and uterus were single A Foley catheter was introduced and [illegible] up to the external urethral meatus It was concluded by the lack of resistance that the [illegible]

The investigations done were

1 Blood urea 20 mg/100 c c
2 Intravenous pyelographs showed normal functioning of the kidneys [illegible] deformities were noted
3 Plain X-ray of the pelvis revealed an unusual separation of the two pubic bones anteriorly (Plate 1)



Plate 1

On 4th of March 1960 when the patient was fit to be operated upon, a Sling operation was performed for the relief of her urinary complaint

A subumbilical midline incision was made The [illegible]

so that by the vaginal route we could mobilize tissues to reconstruct the urethra from the lower part of the bladder We are not aware of any surgical management of a condition like the one presented The aim of the operation was to design a urethra from the lower part of the bladder itself with the aid of the surrounding fascial and muscular tissues Having constructed some sort of a urethra, the next problem was to keep her continent and also to enable her to void urine when the bladder was full and she had a desire to micturate This could not be achieved on the face of the incomplete type of urethra and consequently the urethro-vesical junction that was possible to construct Therefore, the sling was designed to produce an angulation at the constructed urethro-vesical junction Further assistance to the fascial sling was provided by the con tractions of the rectus abdominis muscles during rises of intra-abdominal pressure In addition, the inner fibres of the pubo-coccygeus, which were brought together in the midline lent further support as a muscular sling The compression of the reconstructed urethra on acts of strain and exertion was complete because of the attachment of the musculo-fascial sling right up to the post-urethral ligament It was so perfect that even a forceful voluntary act resulted in retention of urine This was overcome by teaching the patient the method of relaxing the abdominal and vaginal muscles on attempting to void urine

Summary

A case of bifid clitoris and congeni tal urinary incontinence is presented

The abdomino-vaginal operation performed for the relief of urinary incontinence is described Musculo-fascial tissue is used to buttress the posterior urethro-vesical junction, the pubo-coccygeus muscle is used to form a muscle sling and the anterior rectus sheath to form a fascial sling for the urethra The patient was trained in the act of relaxation of the abdominal muscles in order that she might void urine

References

1 Ballantyne J W A System of Gynaecology edited by T C Allbutt and W S Playfair p 96 1896

2 Bell W B J Obst. & Gyn Brit Emp , 32 112 1925

3 Jeffcoate T N A J Obst. & Gyn Brit. Emp 59, 406 1952

4 Patten B M Human Embryology p 607, 1948 The Blakiston Company New York

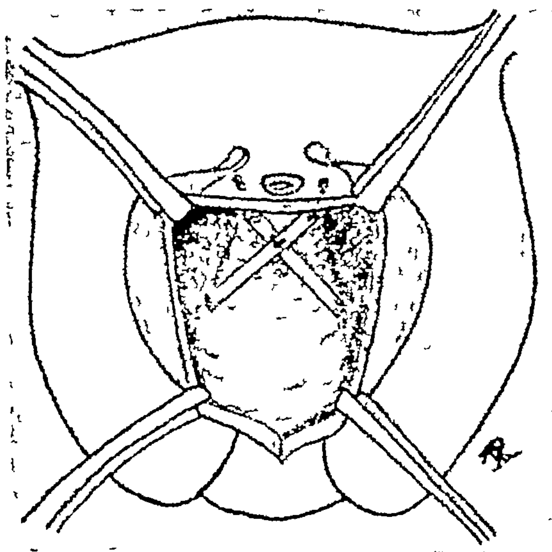


Fig 3

The vaginal flaps were brought together and stitched The abdominal incision was closed An indwelling catheter was kept and was removed on the 10th post-operative day However, as the patient had retention of urine, the indwelling catheter was re-inserted When the catheter was removed on the 14th post-operative day, she could void urine herself It was found that when she strained in order to micturate, she actually failed in the act, but when she was taught to relax her abdominal muscles during the act of micturition, she succeeded in voiding urine Up to the present day, the patient has never had either incontinence or retention of urine

Discussion

This case of bifid clitoris is of great interest, not only because it is associated with urinary incontinence but also because of two other features firstly, whereas Diphallus is more commonly seen in the male, our case is of the female, and secondly, because our case *is not associated* with other gross congenital anomalies such as extroversion of the bladder septate bladder and anomalies of the kidneys and ureters

The condition of bifid clitoris was known to Ballantyne as early as 1896 In 1925, Blair Bell described the case of a girl with bifid clitoris and a large ventral hernia Again, in 1952, T N A Jeffcoate reported a case of bifid clitoris associated with a large ventral hernia and partial incontinence of urine

The occurrence of this congenital abnormality has been explained in a variety of ways It was thought by some to be a manifestation of twinning and was included under the heading of Double Monsters Others thought it to be an example of atavism, some snakes and lizards having double vulvae According to Patten, there is a defective closure of the ventral body wall in the midline extending from the umbilicus, through the pubic region, all the way to the perineum Hence, it is usual to find bifid clitoris associated with exstrophy of the bladder He further states that each clitoris is really a halved organ which is moulded around, only one corpus cavernosum with the urethra and the corpus spongiosum urethrae wanting Presumably, in the case here presented, either the urethra is absent or the urethra is present but defective not only at the internal sphincter mechanism level but also throughout the urethra and in the region of the compressor urethrae Either of these two postulations will account for the continuous dribbling of urine It is regretted that investigations necessary to determine the mechanism at fault could not be undertaken

In this case a combined vaginal and abdominal operation was performed

of the caesarean section scar occurred in the eighth month before labour started

At laparotomy the baby was found in the peritoneal cavity and was dead The rupture was repaired and sterilization was not done

This patient was first seen in 1957 as she wanted advice regarding any future pregnancy She did not live in Delhi and she was advised to come to Delhi at 30 weeks and to remain in hospital from the 33rd week onwards

She was next seen in early pregnancy in 1959 The date of expected delivery was 21-12 59 She came to Delhi in early October and was admitted on 2 11-59 The ante-natal period had been quite normal

A soft tissue—X ray of the uterus showed some thinning of the uterine scar While in the Nursing Home under observation her movements were restricted and except for toilet facilities she was more or less kept in bed With a view to reducing the intra-uterine tension she was given Chlotride four times a week It was provisionally decided to do a caesarean section on 8 12-59 However on 23 11-59 painless contractions became very frequent and on 26-11-59 although the patient denied any pain she appeared to be very uneasy and the uterus was very irritable It was therefore decided to do a caesarean section immediately as it appeared that labour vas imminent. The baby a living male weighing 6 lbs 1¼ ounces was delivered through a transverse lower segment incision After suture of the incision the previous scar was inspected and was found to be widely separated throughout its length The two margins of the old incision were connected by a muscular layer which was about one millimeter in thickness This incision was repaired and sterilization was not done as this was her first living child The post-operative period was uneventful and she was discharged on 14-12 59

She was kept a few days longer than usual as she had to travel immediately on discharge

Case 3 —Mrs R S aged 28 gravida 3

Obstetric History In 1949 classical caesarean section following trial labour The baby was alive and weighed 5 lbs 12 ounces at birth There was a history of some sepsis during the post operative period In 1954 a lower segment caesarean section following trial labour The baby was alive and weighed 6 lbs

This patient was first seen late in pregnancy The date of expected delivery being 29-10 56 In view of the fact that she had had two previous sections following trial labour elective section was decided upon As her previous babies had been small it was decided to wait until one week before term prior to operating However labour started spontaneously on 16-10-56 and a lower segment caesarean section was done on that day The baby was alive and weighed 6 lbs 1 ounce

At operation the scar in the lower segment was found to be extremely defective There was a wide diamond shaped portion which was only covered by very thin avascular fibrous tissue The old classical caesarean scar showed signs of rupture in the distal half. Because of the extremely defective scars and the fact that this patient had three living children tubal ligation was performed

The post-operative period was uneventful and she was discharged on the 11th day

Case 4 —Mrs K aged 37 gravida 5

Obstetric History Three full term normal deliveries All children alive In January 1956 a classical caesarean section was done at term for placenta praevia The baby weighed 9 lbs and was alive Tubal ligation was perform^d

This patient was first seen when she was about 32 weeks pregnant and because of the facts that pregnancy had occurred during the lactation period and also that having been sterilized she did not expect a pregnancy she was not very sure about her dates It was estimated that the probable date of delivery was somewhere in the first week of February 1957 It appeared from the abdominal scar that the previous section had been a classical one but no definite confirmation of this was available

The patient was anxious to avoid another caesarean section and as the section had been done for a cause other than cephalo pelvic disproportion it was decided to give her a trial labour under verv close observation

A REPORT OF SIX CASES OF RUPTURE OF THE UTERUS (EITHER COMPLETE OR INCOMPLETE)

by

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New Delhi

Rupture of the uterus is one of the most dreaded accidents of labour carrying with it both a high maternal and foetal mortality

The incidence is reported to be anything between 1 in 250 and 1 in 5,000 cases During the last twenty years the cause of ruptured uterus has changed It is now-a-days most commonly seen following previous caesarean sections In a consecutive series of 1664 cases all delivered personally there were 6 cases of rupture of the uterus either complete or incomplete In this series of cases there were 60 caesarean sections, an incidence of 3 5%, out of which 8 were of the classical variety and the remaining 61 were lower segment sections Among these 60 cases 14 were repeat sections

In this same series of cases, 15 patients were delivered vaginally following lower segment sections for reasons other than cephalo-pelvic disproportion Eight of these 15 cases had more than one vaginal delivery Six cases were delivered vaginally after the classical operation

Case 1 — Mrs. T G aged 2[illegible]

Obstetric History In 1937 premature [illegible]

classical caesarean section The baby had a meningocele and a spina-bifida and died after ten days

This patient was first seen in mild labour on 5-12-59 The date of expected delivery was 1-12-59 She had come a day previously from an out-station

An X-ray pelvimetry was done and the inlet of the pelvis was found to be contracted in the antero-posterior diameter The foetal head was floating In view of her previous obstetric history, it was decided to do a caesarean section

At operation the baby a living female weighing 7 lbs 1 ounce, was delivered through a transverse lower segment incision After suture of the lower segment incision the upper segment was inspected There were fairly dense omental adhensions between the fundus of the uterus and the abdominal wall On separating these adhesions the previous classical caesarean scar was found to be widely separated and was covered only by peritoneum Rupture had occurred through all the muscular layers The margins of the ruptured scar were trimmed and the rent was sutured As this patient had no previous living children sterilization was not performed

She was discharged after an uneventful post-operative course on the 12th day and was advised to avoid another pregnancy for the next two years She was also advised admission to hospital at least one month before delivery in any future pregnancy

Case 2 — Mrs R [illegible] G aged 25 [illegible]

Obstetric History. In 1954 classical [illegible]

a sedative at night but returned three hours later in a state of acute anxiety with some bright bleeding per vaginam She was also by this time having mild uterine contractions every ten minutes

She was examined in the theatre with all preparations for a caesarean section if necessary On examination the os was found to be one finger dilated but the margins were firm and rather irregular The cervix was three-fourths effaced No placental tissue could be found in the lower segment The membranes were ruptured artificially and she was allowed to proceed with the labour After rupture of the membranes the vaginal bleeding ceased and contractions continued for the next five hours at regular five minute intervals The patient was given pethidine and she was well relaxed between contractions

At 4 00 A M she suddenly experienced very severe pains one after the other, after which vaginal bleeding recurred On examination the head was found to be well engaged in the pelvis and the os appeared to be fully dilated However posteriorly some very irregular and firm cervical tissue could be felt and on abdominal palpation a sausage shaped mass could be palpated in the region of the left broad ligament Regular uterine contractions had ceased and the uterus was firmly contracted over the foetus No foetal heart sounds could be heard A diagnosis of rupture of the uterus was made and laparotomy was undertaken as soon as blood was available

At laparotomy no free fluid was found in the abdominal cavity but on displacing the uterus upwards a rent was seen in the lower segment running transversely from the right broad ligament and extending to the left broad ligament Between the two leaves of the left broad ligament was a large collection of blood clots A stillborn foetus was extracted and as the tear was extremely irregular a rapid supra cervical hysterectomy was performed The clots were evacuated from the left broad ligament and a pack was inserted as a fair amount of oozing was taking place

The first five days of the post operative period were extremely stormy on account of ileus The bladder was drained by an indwelling catheter for seven days after which it was removed and normal bladder function was re established The patient was discharged well on the 25th day

Summary

Six cases of ruptured uterus are presented

In four cases the rupture was incomplete In three cases, the scar of a previous classical caesarean section was involved and in the fourth case both the classical incision and the lower uterine incision were defective

There were 2 cases of complete rupture of the uterus one following a classical caesarean section and the other following amputation of the cervix

There were no maternal deaths Two infants were lost, both in cases of complete rupture

These six cases in a series of 1664 personally conducted cases indicate the change in aetiology of ruptured uterus and also indicate the superiority of the lower segment incision in the uterus

Note —Case 6 is reported in detail in the Journal of Obstetrics and Gynaecology of India. Volume VII No 4 June 1947

(By courtesy of the Editor, Journal of the Association of Medical Women in India)

On 25-1-57, a vaginal examination showed the head to be dipping well into the pelvis [the] pelvic cavity was roomy The cervix [th]ree fourths effaced and the os was [on]e finger loose No placental tissue could [be] felt and no scar could be palpated in the [lo]wer segment

She was admitted on 29-1-57 on account [of] increasing oedema of the legs There [wa]s no albumen in the urine and the blood [pr]essure was normal

On 13-2-57, she had slight vaginal bleed[in]g with some lower abdominal pain [Th]ere was no tenderness anywhere per [ab]domen Irregular uterine contractions [co]mmenced on 14-2-57 in the afternoon [an]d at 7-30 p m as the contractions were [be]coming stronger, there was a sudden gush [of] *bright blood per vaginam Impending* [ru]pture of the uterine scar was feared as placenta praevia had been definitely [ru]led out in the previous pelvic examina[tio]n It was therefore decided to perform [a] caesarean section immediately As the patient desired sterilization, a classical section was done The uterine incision was made through the previous scar which was found to be very thin The placenta was lying immediately underneath this scar, and in places was of the acreta type The lower portion of the scar was partially ruptured and the margins of the rupture were bleeding profusely After delivery of a living male baby weighing 9 lbs 5 ounces it was found necessary to excise a portion of the uterine musculature as the placenta could not be separated over the thinned portion of the scar Tubal ligation was once more performed No evidence of any previous tubal ligation could be found but [the] [m]iddle third of the round ligaments [ap]peared to have been excised Trans[fu]sion of 500 c c of whole blood was given [an]d the patient was discharged on the 11th day following an uneventful post-[op]erative cour[se]

occurred Details of the indications for this section were not available There was no history of sepsis post-operatively

This patient was first seen in early preg nancy and was very anxious to avoid another section if possible X-ray pelvimetry was done just before term and the pelvis was found to be normal with no evidence of any cephalo-pelvic disproportion It was, therefore decided to give her a trial labour

Her date of expected delivery was 2 9 55 and on 12-9-55 pains started spontaneously She was admitted at 9-30 p m and labour progressed normally At 4-00 a m on 13-9-55, when she appeared to be just reaching the second stage of labour, regular contractions suddenly ceased and a *diagnosis of ruptured uterus was made* The foetal heart sounds disappeared very quickly before operation could be undertaken At operation, the previous scar was found to have ruptured in the entire length and was plugged by the buttocks of the baby The foetus was extracted and repair of the uterus was undertaken The first three days following the operation were complicated by a certain amount of ileus The patient was discharged on the 16th day following operation

Case 6 —Mrs B B aged 24

Obstetric History In 1938, full term normal delivery Baby alive In 1940 full-term normal delivery Baby died in the neo-natal period of thrush In 1944 3½ months spontaneous abortion In 1945 dilatation and curettage along with amputation of the cervix had been performed Details of this operation were not available but though the patient was under the impression that she had merely been cauterized it appeared both from her history and the findings on vaginal examination that amputation of the cervix had been performed

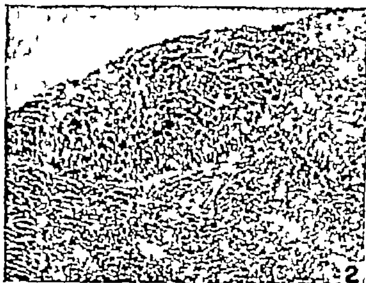


Fig 2
Photomicrograph of a section from the body of the uterus showing an area of intraepithelial carcinoma. H & E stain X 110

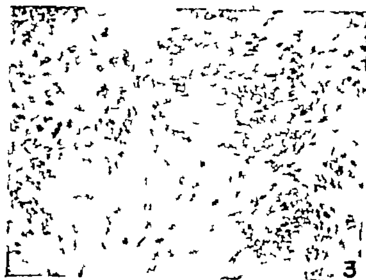


Fig 3
Photomicrograph of epidermoid carcinoma of the cervix uteri H & E stain X 65

metaplasia of the endometrium is known to occur and rarely epidermoid carcinomas or adeno-acanthomas do occur in the body of the uterus The simultaneous occurrence of an epidermoid carcinoma of the body of the uterus and cervix must be an extremely rare phenomenon It may be argued that in the present case, the epidermoid carcinoma of the cervix may have spread into the body of the uterus The presence of a wide area of intraepithelial carcinoma of the endometrium clearly indicates, however, that the body carcinoma was an independent lesion and arose on the basis of pre-existent squamous metaplasia

Summary

A case of epidermoid carcinoma of the cervix associated with an epidermoid carcinoma of body of the uterus is reported

EPIDERMOID CARCINOMA OF THE CERVIX AND BODY OF THE UTERUS

(A Case of Pathological Interest)

by

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The cancer of the cervix stands first in frequency of all the cancers seen at the Tata Memorial Hospital, Bombay During the years 1941 to 1959, there were 5,557 cases of cervical carcinomas, histologically diagnosed and recorded in the files of the Department of Pathology Amongst these, there were 424 operated specimens In suspected cancer of the cervix, it is our routine to take a section from the body of the uterus including the endometrium The following case is the only one in which an epidermoid carcinoma of the cervix was associated with an epidermoid carcinoma of the body of the uterus



Fig 1
Specimen of uterus Note an ulcerated growth in the cervix and thickened endometrium

Case

A woman aged 50 years (No X 3657) was admitted to the Tata Memorial Hospital on June 2 1960 for post-menopausal bleeding per vaginam On examination the cervix showed an ulcerated growth easily bleeding on touch The size of the uterus was difficult to make out Biopsy of the cervix showed an epidermoid carcinoma

Gross Observation Wertheim's hysterectomy was done The specimen of the uterus measured 7 x 4 x 2 cm (Fig 1) On opening the uterine cavity purulent material came out The cervix showed an area of ulceration It was hard grey and opaque The endometrium measured 1 5 cm in width The endometrium was thickened 4 m m in width greyish white and opaque

Microcopic Findings Sections through fundus of the body of the uterus showed a lining of stratified squamous epithelium with changes of intraepithelial carcinoma (Fig 2) Besides this there were infiltrating cords of polygonal cells with nuclei showing a marked variability in size and shape (epidermoid carcinoma) Sections through the cervix (Fig 3) showed cords and nests of polygonal cells with large hyperchromatic nuclei Horny pearls and mitosis were common

Comment An extensive review of literature has failed to disclose a report of a similar case Squamous

Her past obstetric history was an unusual one In 1953 her first pregnancy ended in a spontaneous abortion of five months. In her second pregnancy she had a hydatidi form mole and abdominal hysterotomy right ovariotomy and left ovarian cystectomy were done on 16th May 1954 at St Stephens Hospital, Delhi Her third preg nancy ended in a spontaneous abortion of a hydatidiform mole at 4 months in April 1958 She also had oedema and hypertension during this pregnancy Following this she had regular periods last period being on 11th November 1959 She was having slight vaginal bleeding lasting for one to two days, at intervals of 8-10 days since 13th February She had not felt any foetal movements at any time during this preg nancy

Examination at the time of admission revealed slight pallor pulse 100/min blood pressure 110/20 mm of Hg Cardiovascular and respiratory systems were normal Breasts were active Abdominal examination revealed a median sub-umbilical scar Fundal height was of about 28 weeks of pregnancy The feel of the uterus was rather doughy No foetal heart sounds were heard Slight fresh vaginal bleeding was present Vaginal examination revealed tightly closed cervix. Uterus was of 27-28 weeks' pregnancy and no internal ballot ment could be elicited. Since patient had lost fair amount of blood at home, she was given 700 mls of blood soon after admission.

Repeat x-ray of abdomen on 13th May 1960 did not reveal any foetal parts After admission the bleeding was minimal. In view of the size of the uterus and previous hysterotomy scar recurrent hydatidiform mole and tightly closed cervix it was de cided to do an elective hysterotomy on 17th May 1960 However on 15th May she started having labour pains and spontaneously aborted a hydatidiform mole which filled up a 25 cm diameter basin (Fig 1) She was given 0 5 mgm ergo metrine injection and glucose drip was started, and remaining bits of mole were removed digitally 700 mls of blood were given during and after the evacuation. Her condition remained satisfactory except for slight rise of temperature following the second transfusion Her recovery was uneventful

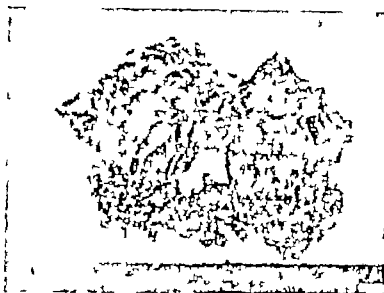


Fig 1
Showing gross appearance of hydatidiform mole.

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Hydatidiform Mole Probably benign (Group II of Hertig & Mansall 1958) with slight to moderate hyperplasia of trophoblast (Figs. 2 3)

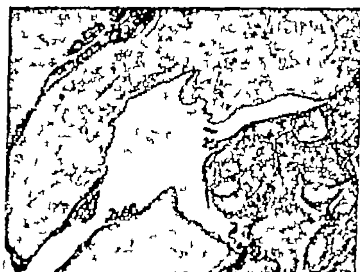


Fig 2
Photomicrograph of the hydatidiform mole (x 60)

Serological test for syphilis on her and her husband s blood were negative

Her blood group O Rh + ve and hus band s A Rh + ve Husband s semen ex amination revealed no abnormality

Follow up

She was seen at the follow up clinic on 26th June 1960 and on 25th July 1960 She

RECURRENT HYDATIDIFORM MOLE

(Report of a Case with Third Mole)

by

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and

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There seems to be no estimate in the literature as to the frequency of recurrence of hydatidiform mole Several series of 50-100 cases have been published with no instance of recurrence in these consecutive cases There are scattered reports of molar pregnancy occurring more than once in the same woman The repetition is however rare (Moir, 1956) Essen-Moller in 1912 reviewed the literature and found 10 case reports of repeat moles to which he added 2 cases of his own According to Posner and his associates (1955), 23 cases of repeat moles, 22 with second mole and 1 with third mole, had been reported However, Chesley, Cosgrove and Preece (1946) after a deligent search in the literature from 1879-1946, finally concluded that 43 authentic cases of recurrent mole had been reported till then To this may be added 1 case of Posner et al (1955) and 4 cases of Acosta-Sison (1959) In most of the recurrent molar pregnancies reported the mole has occurred a second time There are 9 reports of mole occurring for a third time

Osborn (1865), Fritsch (1892) and Digonnet (1939) described one case each of four moles occurring in the same woman Lemaire (1911) described a case having 6 moles, Muggia (1920) one with 7, Mack and Catherwood (1930) one with 10 and Essen-Moller (1912) one with 18 moles Thus the case reported below appears to be the 10th reported case of third molar pregnancy

Case Report

S D, 26 year old, 4th gravida, was admitted on 13th May 1960 at 11 P M with history of severe bleeding per vaginam since the same evening Her last menstrual period was on 11th November 1959 (26 weeks ago) She was having slight irregular vaginal bleeding since 13th February 1960 She had attended the out patients department on 18th March 1960 Hydatidiform mole was suspected and x-ray of the abdomen was advised This did not reveal any foetal parts She was advised admission for termination of pregnancy However she was anxious to continue with pregnancy and did not turn up till the 13th May 1960

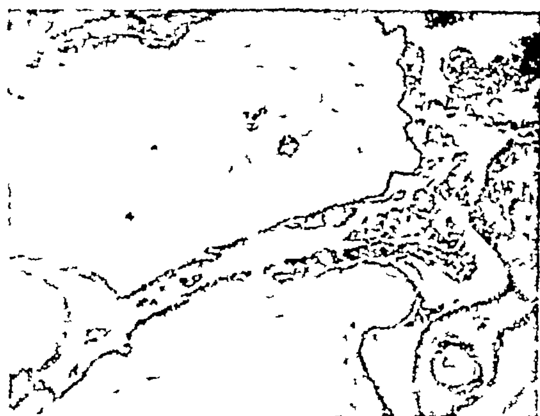


Fig 3
Photomicrograph of the hydatidiform mole (x 60)

had no complaints She had a normal period on 18th July 1960 Vaginal examination revealed no abnormality She has been advised to return to the follow-up clinic at regular intervals for clinical check-up Freidman's test on 23rd September 1960 was negative

Discussion

This unfortunate patient had attempted pregnancy on four occasions First one ended in abortion and the remaining three in hydatidiform moles She is anxious to have a baby and repeatedly asks if she could possibly have a baby and if something could be done for her so that in her future pregnancies she should not have a hydatidiform mole again One wonders if any one has an answer to her queries

In most of the cases reported in the literature, moles have occurred in successive pregnancies or were separated by early abortions In two of the four cases of repeat molar pregnancies reported by Acosta Sison (1959), the molar pregnancies were separated by one and two term deliveries The interspersion of normal pregnancies between moles seems to be unusual Hertig (1960) with his vast experience on habitual abortions has seen three cases of second or third recurrent mole He states that the more abortions, a patient has, the more likely they are to be of same type and mole is only an uncommon example of abortion

Toxaemia and Molar Pregnancy

Toxaemia is not infrequent association of molar pregnancy Essen-Moller (1912) collected 18 cases of associated eclampsia reported in the literature In Brew's (1939) cases albuminuria was present in 37% of his cases In Chesley et al's cases the incidence of toxaemia was 15 8% This patient had oedema and hypertension in the second molar pregnancy though there was none in the third

Lutein Cysts and Molar Pregnancy

According to Moir (1956) in some 50% of cases lutein cysts are present and are generally bilateral, though not necessarily of equal size It would appear that they are almost certainly the result of the pathological condition in the chorion as they usually disappear after the removal of the mole They are generally assumed to be caused by the excessive stimulation of the high concentration of chorionic gonadotrophic hormone present in the vesicular mole This patient had possibly the lutein cysts in her first molar pregnancy These were removed (at another hospital) at the time of hysterotomy and some ovarian tissue was preserved Unfortunately, histopathology of these was not done But it is unlikely that

CERVICAL INCOMPETENCY

(Report of Two Cases with a Review)

by

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The causes of habitual abortion are manifold. Although deep lateral cervical tear has long been mentioned as one of the causes and trachelorrhaphy was being done to correct it, the recurrent middle trimestral abortion as a result of cervical incompetency due to mechanically incompetent internal os has emerged as a clinical entity only in recent years. The condition was recognised and treated surgically at about the same time in U.S.A. by Lash and Lash, in France by Palmer and in India by Shirodker. Lash (1950) plicated the thinned-out anterior region of the internal os with a view to repair the anterior defect of the cervix immediately following abortion. Later, Lash (1953) changed his technique and he as well as Palmer (1950) narrowed the cervix by resecting a portion of anterior wall in the form of wedge of longitudinal strip. Both of them limited their operation to non-pregnant women. But Shirodkar was the first surgeon who began to operate in the pregnant state when the cervix was already effaced and dilated to some extent and even when the bag of waters bulged into the vagina. He, realising that the defect at the internal os was more commonly in situations other than the anterior, tightened up the internal os by a fascia lata strip in the form of a purse-string. Recently, several articles, reporting on cases of cervical incompetency treated surgically, have been published by Mc Donald (1957), Green Armytage & Browne (1957), Bergman & Genell (1957), Barter (1958), Page (1958), Durfee (1958) and Easterday and Reid (1959).

This paper presents reports of 2 cases of habitual abortion treated by buried purse-string operation, together with a review of the subject.

Case 1

S. N. D. age 22 years was first examined during her third pregnancy while she was carrying 16 weeks. Four weeks back she was treated successfully for threatened abortion when she had slight irregular bleeding and lower abdomenal pain.

The first pregnancy was complicated by eclampsia and she delivered naturally a dead baby at 39th week of pregnancy. The second pregnancy ended in premature labour at 30th week and the baby expired.

Now the pelvic examination revealed an unilateral tear of the cervix at 1 o'clock position extending up to the vault. The internal os was found closed.

She was kept under observation but at the 28th week the membranes ruptured spontaneously and she delivered a premature baby weighing 2 pounds that died after 3 days.

5 Dıgonnet L Bull Soc Gyn et al Obs , 28, 400, 1939
6 Essen-Moller E Studıent uber dıe Blasen mole Wıesbaden Germany, Bergmann 1912
7 Fındley P Am J Obst , 75, 968, 1917
8 Frıtsch H Cestralbl f Gynak, deıpz, 16, 354, 1892 (Quoted by Chesley et al)
9 Hertıg A. T Personal communıcatıon, 1960
10 Hertıg A T , Mansall H Tumours of the Female Sex Organs part Hydatıdıform Mole and Chorıon Epıthelıoma Washıngton D C , Armed Forces Instıtute of Pathology 1958
11 Hıtschmann F Bıol u Path Weıbes 7 (Part 2), 459, 1928
12 Lemaıre Bull. Soc d'obst de Gynec de Par , 14, 117, 1911 (Quoted by Chasley et al)
13 Mack H C & Catherwood A E Am J Obst & Gyn , 20, 670, 1930
14 Moır J C Munro Kerr's Operatıve Obstetrıcs, Baıllıere, Tındall and Cox, London, 1956
15 Muggıa V Ann dı obstet gınec, 42, 19, 1920
16 Osborn A G B M J , 2, 180, 1865 (Quoted by Chesley et al)
17 Posner A C , Kushner J I & Posner L B Obstet & Gynec , 5, 761, 1955

when compared with those obtained by various specific lines of treatment, do not show a difference that is statistically significant

In these cases, there should be a history of a difficult labour or an operation on the cervix followed by several successive abortions in the middle trimester of pregnancy The abortions start with the sudden rupture of membranes without any 'pains' and is completed in a very short time Each abortion occurs at about the same period of gestation.

Patients, who come with pregnancy, might complain of a feeling of bearing down without any definite pain. There may be vaginal discharge that apparently suggests moniliasis This, according to McDonald (1957), is due to separation of the opercula

Repeated speculum examinations at weekly intervals have been advocated by McDonald, while Shirodkar emphasises that the only certain way to diagnose is by weekly digital examination Diagnosis is made when, in the absence of pains, the cervix is found effacing and the membranes or bag of waters is seen or felt through the gaping internal os Sometimes, the membranes may be found bulging out of the external os in the vagina in the form of an hour-glass Typically, the bag of waters is not under tension in these cases

In the non-pregnant state, the diagnosis is made by passing a cervical dilator under anaesthesia or by radiological means Green Armytage and Browne diagnose these cases when a No 4 Heger dilator (4 m m) passes easily through the cervix but Palmer and Lacomm (1948) say that a Heger No 8 (8 m m) should pass the internal os easily The latter criterion seems to be more rational since Asplud (1952) and Dorangeon (1956) demonstrated radiologically that the maximum diameter of the cervical canal averages 6 m m Page (1958) considers 7 m.m dilatation as the criterion of cervical incompetency Bergman and Svennerund (1957) devised a traction test by which the traction force required to pull out a No 16 Foley catheter filled with one ml of saline through the cervix is noted in gms A traction less than 600 gm indicates incompetency

Confirmation of the diagnosis by hysterogram was recommended by Palmer Later, Rubovit, Cooperman and Lash (1953), Green Armytage and Brown (1957), and Mann (1959) used the balloon technique to demonstrate incompetent cervix Barter, however, considers radiological methods not only unnecessary but also undesirable in view of the recent tendency to minimise the amount of radiation to an individual

Surgical Treatment Uptil now, three main types of operative procedures have been described In one, the defect which is thought to be in the anterior cervical wall, is repaired by plication. In the other type, for the same reason, resection of anterior wall is done in the form of wedge, longitudinal strip or lozenge-shaped area (not involving the external os) followed by suturing In all of these techniques that are advocated by Lash (1957), repairs are done immediately after abortion or in non-pregnant women The third group consists of tightening of the internal os by a buried purse-string suture (Shirodkar 1953, 54) or by a superfi-

She was next seen carrying 8 weeks (4th pregnancy) and was followed up to the 24th week when she was admitted because pelvic examination revealed that the internal os was dilated to one finger and the membranes were felt through the os She had no symptoms at that time

On 9-7-59 (cyesis 25 weeks), a buried purse-string ligation of the cervix was done by the braided nylon suture, the knot being placed posteriorly. Morphine sulphate was given during the first 2 post-operative days She was allowed out of bed on the 7th day and was discharged on the 15th day

On 13-10-59 (cyesis 38 weeks 4 days), 14 weeks after the operation, she was admitted with labour pains and ruptured membranes The suture was felt at the thinned out margin of the external os and it was cut together with the thin overlying cervical mucosa She delivered naturally a living baby weighing 4 pounds 10 ounces The mother and the baby were discharged healthy on the 7th day Both the mother and baby have been followed up regularly On 9-10-60 she was carrying 20 weeks' pregnancy

Case 2

P D, 9th gravida, aged 27 years, was admitted on 28-4-59 with the history of slight vaginal bleeding for the past 4 days following an amenorrhoea of 12 weeks

The first 3 pregnancies were normal and 3 living mature babies were delivered naturally The next two pregnancies ended in premature still-births at the 28th week Subsequently, she had 3 abortions between the 12th and the 20th week, each abortion started with watery discharge without pains

Pelvic examination revealed a left lateral tear of the cervix extending up to the vault

The internal os admitted the index finger and the membranes were felt without any tension There was no bleeding but a mucoid vaginal discharge was present

On 1-5-59, the cervix was tightened by a buried purse-string braided nylon suture, the knot being placed anteriorly The post-operative period was uneventful She was readmitted on 20-8-59 (cyesis 30 weeks 4 days), 15 weeks after the operation and delivered a premature baby weighing 2 pound 9 ounces, naturally after the suture was cut The baby expired on the 9th day The trace of the patient was lost till she got admitted as an emergency case and delivered a premature baby at 29th week of pregnancy on 5-9-60

Discussion

Etiology Cervical incompetency is essentially a cause of secondary habitual abortion It rarely occurs in the first pregnancy and it is very doubtful if congenital or constitutional factors play any part in the etiology It is mainly the result of obstetrical or surgical trauma to cervix in the form of difficult forceps or breech extraction, deep cervical laceration, dilatation of the cervix either alone or with curettage and amputation of the cervix as well as vaginal hysterectomy A technically defective lower segment caesarean section, specially if the uterus is opened by a vertical incision, may be a causative factor as well In about half the cases reported by McDonald, there were histories of dilatation of cervix and curettage before the abortion sequence started As a result of this trauma, the cervix becomes incapable of resisting the increasing intrauterine pressure In many cases, however, no definite history is available and no specific anatomical lesion is demonstrable

Diagnosis It is essential that stringent diagnostic criteria should be fulfilled before any operative procedure is undertaken This is all the more important in cases of habitual abortion where "placebo therapy" (Javert 1956), psycho-therapy (Mann 1959) or no treatment (Swyer and Daley 1953), give results, which,

suture material and also substituted talc as a fibroblast stimulating substance

Selection of suture material should be based on whether it is desired to have a permanent effect or just a temporary one, whether a stricture effect as opposed to the idea of forming a length of cervical canal as by a ribbon is desired and whether the primary idea is to stimulate connective tissue growth or to have a simple mechanical constriction

Optimum Time of Operation When cervical incompetency is diagnosed in a pregnant woman, it seems reasonable to attempt conservation of the pregnancy by surgery If, however, the diagnosis is made in a non-pregnant woman, the choice lies between operating at once and waiting for conception to occur While Shirodkar operates when the patient comes, Barter advocates surgery during pregnancy because the dissection is easier and the cervix can be closed more tightly, due to softness of the tissue Moreover, if done in the non-pregnant state, the patient may not conceive at all, though not on account of the operation itself, and this might lead to litigation.

Opinions differ regarding the optimum time of operation in pregnant cases, although it is certain that it is desirable to operate before the membranes bulge into the vagina Barter advises operation before the effacement or dilatation of the cervix occurs (but then the diagnosis becomes somewhat doubtful unless it was already made in the non-pregnant state) to eliminate the chance of amnionitis, which might irritate the uterus and precipitate abortion. He advises operation between the 14th and the 18th week, while Shirodkar advises it between the 12th and the 24th week and Green Armytage and Browne between the 15th and the 20th week. In McDonald's series, the average period of pregnancy was 22 weeks in successful cases and 19th week in cases of failure It appears reasonable that when the diagnosis is certain, surgery may be undertaken before the effacement or dilatation of cervix starts In cases of doubt, it is better to do weekly examinations till the diagnosis of cervical incompetency is made final

Complication and Difficulties Amongst post-operative complications, the most serious one of reactionary haemorrhage was mentioned by Bartar In 3 cases out of 23, he observed reactionary haemorrhage of severe nature from the vaginal mucosa Two cases required resuturing and one case a vaginal packing and blood transfusion McDonald said that for the first 24 hours there may be painful contractions that are controlled by morphia Amongst remote complications Barter mentioned absorption of fascia and slipping of the fascia off the cervix.

Further, the suture frequently cuts through the cervix to lie under the endocervix In both the cases reported here the nonabsorable purse-string suture was found to have slipped down along the deep aspect of the mucosa to lie at the margin of the external os, when they were examined at the onset of labour pains Easterday and Reid reported about two cases of their series, where there were severe lacerations of the cervix after the onset of labour pains and before the sutures were out Greenhill (1959-60) mentioned that at least

cial purse-string (McDonald 1957) By this method, it is possible to operate on pregnant as well as non-pregnant uterus

Buried Purse-string Technique Anterior incision is made horizontally at the cervico-vaginal junction It should be at least one inch in length so as to allow the bladder to be pushed up exposing the region of the internal os The posterior incision is usually a small one and Shirodkar places it vertically at the cervico-vaginal junction, whereas Barter gives a horizontal, one-inch-long incision and states that it should be 2 inches away from the external os

The knot of the purse-string suture is usually placed anteriorly, although Green-Armytage and Browne placed the knot posteriorly to avoid bladder irritation Barter fixed the purse-string with posterior cervical wall by means of separate interrupted stitches

Judging the tautness is the most difficult step, for if it is not of the correct degree, either the suture cuts through or the operation fails In the non-pregnant state Green-Armytage and Browne put in a No 4 Heger dilator in the cervix and the suture is tightened, till it falls out by itself During pregnancy, personal judgment is the main factor A finger used like the dilator seems to be very helpful

Choice of Suture Material Since Shirodkar tightened the cervix with fascia lata strip, innumerable variations in the technique have been suggested and performed, concerning mainly the type of suture material that is used Barter used both autogenous and homogenous fascia strip and suggested Dacron mesh as used for blood vessel prostheses

Others have used braided silk (McDonald), monofilament nylon (Green Armytage and Browne), *perlon ribbon* (Antoine), chromic catgut (Read), tantalum wire (Johnstone), *catgut ribbon* (Page), polythene tube containing interwoven steel wire (Easterday & Reid) In the present two cases braided nylon was used

The best type of suture suitable for the purpose is yet to be found

Although suture in the form of thread is being used extensively, it has been found to cut through cervical tissue as the pregnancy advances In fact, Green Armytage & Browne as well as this writer allowed vaginal delivery after cutting the suture that became easily palpable just beneath the cervical mucosa, when the pains started This cutting through the cervix might be avoided if the suture is used in the form of a ribbon rather than a thread

Autogenous fascia lata as used by Shirodkar gives a good length of the cervical canal but leaves a scar in the thigh and the graft may be absorbed in certain cases If this is used, elective caesarean section near term is desirable in successful cases Preserved homogenous fascia, though, do not leave a scar in the thigh, frays easily and there is a chance that the graft might not take and get absorbed

It therefore appears that some synthetic material in ribbon form is likely to prove a better suture material Dacron mesh might provide an excellent source of connective tissue growth Page (1958) abandoned the use of non-absorable

TABLE I

Chances of Successful Pregnacy

Number of previous abortion	1	2	3	4	2 or more	3 or more	5 or more
A Spontaneous cure rate (calculated chances)							
Malpas (1938)	78 4%	62%	27%	6%			
McGregor (1939)		50%	20%	10%			
Eastman (1947)	86.8%	63.1%	16.4%	2%			
B Spontaneous cure rate (observed result)							
Bevis (1951) (with rest and reassurance)			79%	75%		81%	100%
Swyer and Daley (1953)					75%	55%	
C Cure rate with medical treatment							
Smith (1948) (oestrogen)		84%	87%	65%		77%	40%
Bishop (1950 1952) (progesterone implant)		85%	76%	62%			
Swyer and Daley (1953) (progesterone implant)					80%	74%	

Different authors have claimed good results by different methods of treatment of habitual abortion. These results are satisfactory when compared with the calculated prediction of Malpas, McGregor and Eastman But when compared with the observed results, the fallacy becomes apparent

Table II shows the results of surgical treatment of habitual abortion, diagnosed to be due to cervical incompetency, published by various authors The average cure rate is 66 6%, which, when compared with observed spontaneous cure rate (Table I), does not show much difference But the latter data are those of habitual abortion as a whole

Therefore, before the real value of surgery in cervical incompetency is found out, the spontaneous cure rate in similar group of patients has to be found out by treating alternate cases of cervical incompetency by surgery Until that is done, it will not be possible to determine the value of these operative procedures in habitual abortion due to cervical incompetency In the meantime utmost care be taken to select the cases for surgical treatment

3 cases of rupture of the uterus above the line of closure have been reported

Post-operative Treatment Green Armytage and Browne kept the foot end of the bed raised for 24 hours and McDonald gave morphia during the same period Barter used progesterone and thyroid in varying doses while Easterday and Reid gave progesterone only Barter allowed his patient to get out of bed on the 10th post-operative day and McDonald on 3rd to 7th day

Mode of Delivery After operation, if the labour starts before the desired period of pregnancy has been attained, cutting the ligature to get a vaginal delivery is justified since the particular suture has failed in its purpose

If, however, proper maturity of the foetus is attained, the choice has to be made between vaginal and abdominal delivery The patient is faced with the prospect of either repeat section or repeat ligation of cervix, if she desired to have further children If no further children are desired, cutting of suture and vaginal delivery is indicated

While Shirodkar as well as Durfee (1958) preferred abdominal delivery, McDonald performed caesarean section in only 2 out of 70 cases and for other obstetric reasons Amongst 14 successful cases, Barter allowed vaginal delivery in 4 cases only In the opinion of Green Armytage and Browne when pains start the suture should be cut vaginally in all cases as they lie just beneath the endocervix unless some other indications require caesarean section After cutting out the suture, if the delivery is not imminent in the next 48 hours abdominal delivery should be done Likewise Easterday and Reid preferred vaginal delivery after cutting of the purse-string suture

Results

Before assessing the results of this new operation, it is necessary to consider several factors There are multiple causes of habitual abortion and in many cases the cause can not be found out Incompetent cervix leading to habitual abortion is diagnosed even without a definite anatomical lesion and this might easily lead to error in selection of cases for operative treatment and make assessment of results difficult

The cases of habitual abortion fall under two main groups the larger group where the abortion sequence is due to chance occurrence in successive pregnancy of one of the random causes and the smaller group where the abortions are attributable to a truly recurrent cause The chance of having a mature baby in the latter group is very remote, but in the former group spontaneous cure could be expected every time the patient becomes pregnant

Since these two groups are very frequently indistinguishable, the value of a particular treatment in these cases must be assessed against spontaneous cure rate which is still controversial

In 1938 Malpas, in 1939 McGreger and in 1947 Eastman calculated mathematically the chances of successful pregnancy in cases of habitual abortion But the observed results of pregnancy in these cases have been found much better than mathematical prediction (Bevis, Swyer and Daley) (Table 1)

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A CASE OF AMOEBIC ULCER OF VAGINA'

by

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Amoebiasis in general is a problem disease of our country but amoebiasis of genital tract is rather rare The cause of rarity of the infection of genital tract by Entamoeba hystolytica is not fully understood This case of amoebic ulcer of vagina is interesting because of the fact that it was diagnosed very late by method of trial and error

The patient would have been cured earlier if one had suspected the presence of such a malady in the female genital tract

Case Report

R R D aged 44 years female ward attendant T B Centre was referred to Cancer Clinic as a case of carcinoma vagina from our Gynaecological Outpatients Department in February 1958 Patient was admitted from Cancer Clinic for investigation as diagnosis of carcinoma vagina was doubtful on clinical examination She had following complaints at the time of admission

i Foul smelling discharge 3-4 months ii Weakness iii Backache

Menstrual history — Cycle — $\frac{5—8}{30}$ flow normal.

She was having this foul smelling discharge in between menstrual periods and also with menstrual flow

Obstetrical History Three children all full-term normal deliveries Puerperium afebrile Last child 18 years old.

During the 3rd pregnancy she had urinary trouble and fever in the 6th month for which she was hospitalized treated and cured It was perhaps B-coli infection

Past History She had once joint pain and fever for which she was hospitalized and treated many years ago

No history of dysentery as far as she could remember

Family History Husband died of asthma 2 years ago 3 sons all alive and healthy

Personal History Nothing of importance

Gastro intestinal Tract. Appetite fair Bowel movement once daily Occasional constipation

On examination Height—5 2 Weight —82 lbs No pallor or oedema

Systemic Examination No abnormality except some pain in the movement of right knee.

Pelvic Examination. Uterus anteverted normal size mobile Adnexa not palpable

Specular Examination. There were several small ulcers situated transversely on the posterior vaginal wall Lower lip of cervix was congested

Ulcers were superficial shallow with irregular overhanging margin and floor covered with greyish slough Ulcers bled on touch and necrosed tissue came out on gentle scraping giving the false impression of friability Discharge from ulcers was foul smelling (resembling so called cancerous smell)

After admission, following investigations were carried out.

1 Blood—routine normal—E S R 31 25 mm./hr

2 Gram s staining of vaginal smear — pus cells and staphylococci

3 Stool and urine N.A.D

4 High vaginal swab culture—haemo-

TABLE II

Result of Surgical Treatment

Authors	Suture used	Types of cases	Total cases operated	Successful outcome No	Successful outcome Per cent
Barter (1958)	Fascia	Pregnant	22	14	70
Bergman (1957)	Repair and catgut	Pregnant and non-pregnant	18	13	72
Durfee (1958)	Fasia	Pregnant	24	17	71
Easterday and Reid (1959)	Polyethylene tube	Pregnant	18	13	72
Green Armytage (1957)	Monofilament nylon	Pregnant	8	8	75
	-do-	Non-pregnant	4	1	
Lash (1957)	Repair	Non-pregnant	44	27	61
McDonald (1957)	Silk thread	Pregnant	70	33	43
Read (1955)	Catgut	Pregnant	3	2	66
Shirodkar	Fascia	Pregnant	43	34	79 4
	-do-	Non-pregnant	56	45	85 4
Present cases	Braided nylon	Pregnant	2	1	50
	Average result		312	208	66 6

Acknowledgment

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References

1. Barter et al Amer J Obst & Gyn 75, 511, 1958
2. Bergman P and Svennerund S Internat J Fertility, 2, 163, 1957
3. Bergman P and Genell ibid, 2, 217, 1957
4. Durfee R B Obstet & Gynec 12 91, 1958
5. Easterday C L & Reid D E N England J M 260 687, 1959
6. Green-Armytage V B and Browne M Brit Med J 2 128, 1957
7. Greenhill J P The Year Book of Obstetrics and Gynaecology 1959-60
8. J[illegible] C T Bali Margaret H [illegible] 9 1 1956
9. [illegible] C T ibid 10 2[illegible] 1957
10. Johnstone J Obst & Gyn Brit Emp, 65, 208, 1958
11. Lash A F and Lash S R Amer J Obst & Gyn, 59, 68, 1950
12. Lash A F Internat J Fertility 2, 321, 1957
13. Lewis T L T "Progress in Clinical Obstetrics and Gynaecology", 1958
14. Mann E C Amer J Obst & Gyn, 77, 706, 1959
15. McDonald I A J Obst & Gyn Brit Emp, 64, 346, 1957
16. Page E W Obstet & Gynec, 12 509, 1958
17. Palmer R Brux Med 8 409 1950
18. Rubovit F E, Cooperman N R and Lash A F Amer J Obst & Gyn, 66, 269, 1953
19. Shirodkar V N J Obst & Gyn of Ind 3, 287 1953
20. Sever G I M & Daley D Brit Med J 1 1073 1953

there were ingested R B C

After seeing amoebae in vaginal smear stool examination was repeated At first nothing could be found Then stool was examined after a saline purge Report of stool this time E H Cysts and pus cells

28 6-58 Sigmoidoscopy by Dr R N Tiwari, M S, F R C.S No lesion visualised within 10 inches of intestinal tract

After the above investigations diagnosis of amoebic ulcer of vagina was confirmed and treatment started on 1-7-58

1-7 58 She was given emetine hydrochloride grain one intramuscularly daily along with B complex parenteral and oral. She was also getting Desulan vaginal tablets for local treatment as there was mixed bacterial infection besides amoeba Yatren vaginal douche mentioned in literature was not given in this case

8 7 58 After one week specular examination was repeated Foul smelling discharge had completely disappeared and ulcers were healing

10-7 58 Ulcers had completed healed up leaving behind black pigmented scar at the site of ulcer

12 7 58 This was confirmed by Prof John

In total she had 9 grains of emetrine hydrochloride 1 vial of B Complex and 12 tablets of Desulan Follow up examination on 22 7-58 29-7 58 5-8-58 and on various occasions in 1959 showed a recurrence Her last follow up examination on 31-9 59 showed no evidence of recurrence Stool and urine examination showed no abnormality either However she often visits us for pain in the knee which is perhaps due to osteoarthritis

Discussion

Before discussing certain problems of infection of genital tract by E Hystolytica a brief review of literature is presented

Hegner (1928) for the first time reported presence of E Nana in vaginal washings obtained by Hurtman in the course of some experiments on Rhesus monkey Before this there was no mention about presence of this protozoa in genital tract either in monkey or in human being

Lee (1932) reported two cases with amoebic infection of cervix superimposed on carcinoma cervix

Rose from China has reported cases of amoébic vaginitis in 1937 and and 1941

Bacigalupo and associates from Argentina, in 1942, reviewed literature and described one case

May (1943) reported one case of amoebic vaginitis in an unmarried girl with intact hymen.

Bickers (1943) studying two hundred cases of leucorrhoea observed that about 0 5% cases were caused by E Hystolytica but did not report any case

H S U (Cleland 1944) reported two cases of amoebic ulcers superimposed on condylamatous growth of vulva and carcinoma cervix

De Ravis (1944) reported a case of amoebic infection of the vulva In this case the E Hystolytica were detected in the tissues at autopsy

Morse and Seaton in 1944, Cleland, Garin (1917), Sen 1949, have also reported such cases *B Bernard Weinstein* and *John C Weed* from New Orleons have reported four cases of amoebic vaginitis and have also given a brief review of this condition

Heilbrun 'A' from West Borneo and *Isaza Majid* from Mexico reported such cases *Balsubrahmanyam M* and *Cheriyan O* from India also reported a case of amoebic vaginitis *Bhoumik A* in 1951 reviewed the literature and also reported a case of amoebic ulceration of the cervix and vagina

Mishra has reported two such cases of amoebic vaginitis in 1950 and two cases of infection of cervix and vagina

phillus bacillus and staphylococci

5 X'ray chest—N A D

22-3-58 6 Vaginal biopsy—Chr inflammation with fibrosis C/326

7 Endometrial biopsy — endometrium in oestrin phase C/327

After being satisfied that she was not suffering from either primary carcinoma of vagina or tuberculosis of vagina, the patient was discharged and advised to use mycostatin vaginal capsules Patient was very much relieved to know that she was not suffering from either of the dreadful diseases suspected at the time of admission and she went home happily with the tablets

But to our surprise she again visited the out-patients' department for the persistance of her complaints She was again admitted on 5-6-58 for further investigations

On Examination Pelvic findings were same as before

The following investigations were carried out Blood W R —Negative Vaginal smear was examined in normal saline Vegetative Entamoeba hystolytica and cysts were found

This examination was again repeated on 29-6-58 and 31-6-58 and the presence of vegetative amoeba in smear was confirmed by our Professor of Gynaecology, Pofessor of Pathology, Dr N L Modi and others in the Department of Pathology

31-6-58 Microphotograph of the slides showing vegetative amoeba were taken (Figs 1 and 2)

Besides amoebae there were pus cells and blood cells in the smear Amoeba was of rather larger size than seen in stool examination But it showed typical active movements by showing pseudopodia and



Fig 1
Photomicrograph showing active vegetative amoebae showing pseudopodic besides pus cells and epithelial cells



Fig 2
Photomicrograph showing active vegetative amoebae showing pseudopodic besides pus cells and epithelial cells

They suggest that if all cases of leucorrhoea are thoroughly investigated for E Hystolytica as a routine, this type of infection will not be as rare as it appears The other reason for rarity has been given that many cases of early infection are cured before detection while treating amoebic dysentery with amoebicidal drugs In my opinion also, this type of infection of genital tract is not so rare The cause of rarity is failure to investigate all cases of leucorrhoea, and the other factor, that most of these patients get treatment for dysentery off and on But these are not the only reasons for rarity of this infection in the genital tract. One has to consider certain features which are present in the colon and absent in the genital tract. The first is the lining columnar, single layer, epithelium, in the colon, which is thrown into folds (villae) There are glands (glands of Leiberkuhn) in the colon While vaginal mucosa is squamous and many layered, there are no glands, the folds of mucosa are not so prominent and these are obliterated by repeated childbirth There is not much of stagnation in vagina as in the colon due to its advantageous anatomical position where genital tract is constantly draining its content under the action of gravity The high acidity of vagina no doubt plays an important role in safeguarding any infection of this area, and this factor is also inimical to infection by E Hystolytica The result is that E Hystolytica cannot survive and set up its reaction even though these are getting access daily into the genital tract These are my suggestions which need confirmation by further investigations

While investigating a case of ulcer in the genital tract for the presence of E Hystolytica one has to remember that, in the early stage of infection and when infection is of mild type, there is only superficial rawness in the vagina and cervix with blood-stained vaginal discharge In this stage it is often undetected In the stage of ulceration, it may be a pin's head size or an inch or more in diameter or even larger When the infection is of severe type or of long standing, ulcers are of snail-track type, with rolled up margin and undermined edges, the base being formed by muscular coat which is covered with blackish, greyish or yellowish sloughs The discharge is offensive and at times profuse These are the characteristic features of such ulcers They have to be differentiated from other ulcers of vagina, like carcinomatous, tuberculosis, granulomatous, traumatic and syphilitic ulcers These can be differentiated by usual clinical, laboratory and histological examination

While looking for amoebae one should not be satisfied by examining vaginal swab only The scrapings of the ulcers should be examined for presence of this protozoa as they often attach themselves to the wall of the ulcers If above procedure is adopted most of the cases of amoebic infection of genital tract, where vagina and cervix is commonly involved, can be diagnosed. In the literature there is mention of uterine infection as well by this protozoa If that is suspected by enlarged, tender uterus, in cases of amoebic ulcers of vagina, uterine aspiration should be examined In my opinion one should also try to hunt for evidence

in 1953 *R D Pandit* (1956) from Bombay has reviewed the literature and reported cases of amoebic vaginitis and cervicitis

Chatterjee and *Manson-Barr* have also mentioned, in their standard text books, references about occurrence of infection of female genital tract by E Hystolytica I have not come across so far any reference of this condition in standard text books of Gynaecology and Pathology Recently, Masani has made some reference to this condition in his Text Book of Gynaecology

From review of literature and from our own experience it is rather surprising that infection of female genital tract by E Hystolytica is so rare in a country like ours where amoebiosis of intestinal tract is so common

If other parts of the body, like liver lungs bronchi, mouth, nose, kidney, bladder, ovarian abcess, perianal region and perineal scar, can be affected by E Hystolytica there is no reason why female genital tract should not be also equally affected, if not more, as it is in close proximity to the intestinal tract

The above organs are affected by various emboli or by process of continuity and contiguity

While presenting this case and hunting literature certain queries have drawn my attention and interest about the mode of infection of genital tract by E Hystolytica Secondly the problem of rarity of infection of genital tract, though in close proximity to the rectosigmoid, perhaps the commonest site of intestinal amoebiosis

From literature it appears that active vegetative form of E Hystolytica gets an easy access into the genital tract during act of personal cleaning practised in our parts of the country' The access of amoebae is favoured by presence of lax perineum, perineal tears, presence of rectovaginal fistulae and improper cleansing habits After access these active vegetative forms can survive only when vaginal acidity is lowered

In my opinion besides above mode of infection, the infection of genital tract, especially vagina, can be produced by continuity and contiguity of tissues from rectosigmoid lesions This is proved by the fact that active vegetative form burrows deep in the wall of ulcers and goes on penetrating by process of colliquative necrosis caused by liberation of proteolytic ferments The other possible mechanism is perhaps through venous emboli (as in case of liver abscess) This view is supported by the anatomical fact that there is intercommunication between para-rectal and para-vaginal veins and anastomosis of portal and systemic circulation between superior, middle, rectal and inferior rectal veins This is the possible mechanism for explaining cases of vaginal ulcers in the absence of infection of rectosigmoid region In my opinion both active vegetative forms and cysts, which are the infecting forms of parasite, can also get access and set up their reaction (as shown in our slide)

These are just suggestions and they have to be confirmed by further investigations

The second problem of rarity of this type of lesion in genital tract has been explained, by various authors enumerated before as due to the failure to recognise this condition

BOOK REVIEW

Clinical Obstetrics and Gynaecology Edited by Ernest Page and *Charles S Stevenson* *Published* by Paul B Hoeher Inc 49 East 33 St, New York 16 Y N

This publication is the 3rd number of Vol 3 1960 of a quarterly publication of "Clinical Obstetrics and Gynaecology" It is divided into two parts First part edited by Dr Ernest W Page M D deals with Physiology of Pregnancy" and the second part edited by Dr Charles S Stevenson M D deals with "Endometriosis" The first part contains 10 chapters The second part is dealt with in 7 chapters Each chapter *deals with a different aspect of the* subject and is contributed by a different author Each part is edited in the form of a symposium on a subject

Arrangements of various chapters and their editing are such as to give the reader a very easy reading and very comprehensive information on the present trends in research, their interpretation, in Physiology, Pathology and Clinical application The Book is well produced with bibliography appended to each chapter It is a book which can be recommended not only to research workers, who will find immense material for their thought and further work, but also to the clinician who will find in these pages useful material to help him to reason out the changes in the signs and symptoms and decide the management and treatment of the patient before him

The first part, dealing with Physiology of pregnancy, is treated in 10 chapters viz — Physiology of human placenta at term, Fetomaternal gas exchange, Hormones in pregnancy, Carbohydrate metabolism in pregnancy, Plasma Lipids in pregnancy and in the Newborn, Plasma proteins, Renal functional *changes in normal* pregnancy, circulatory adjustments in pregnancy, Haematologic aspects of pregnancy and Physiology of the Uterine Contractions

The second part dealing with Endometriosis treats the subject in 8 chapters on (1) Pathology of Endometriosis, (2) External Endometriosis — mechanism of origin, theoreti*cal and experimental, (3) Symptoms,* physical findings and clinical diagnosis of Pelvic Endometriosis, (4) Sterility and Fertility in women with Pelvic Endometriosis, (5) Surgical treatment of Endometriosis, (6) Medical treatment of Endometriosis, (7) Some general and special considerations of Endometriosis

The authors and the Editors have placed, before the research workers and the clinicians in obstetrics and gynaecology, the present position in physiology, biochemistry pathology, haematology and clinical aspects in the field of research and practical application in both the subjects without being dogmatic on their own findings The style of presentation and the language are refreshing It is a useful publication to be recommended to all Institutions and to those interested in the subjects

C M

of E Hystolytica from biopsy sections of ulcers and in material from diagnostic curettage

In investigating these cases vaginal acidity should be determined as a routine As it is still problematic how either active or cystic form, after getting access, can set up their usual necrotic reaction in intact epithelium and presence of acid vaginal medium The breach of epithelium or lowered resistance of epithelium by age, trauma and infection, along with lowered vaginal acidity, are perhaps very important predisposing factors for favour of such infection

In the end I will draw the attention of gynaecologists to investigate all refractory cases of leucorrhoea and vaginal ulcers which do not respond to usual local and general treatment If we do so, we can find and cure many such cases with ease and satisfaction This sort of infection is not common in temperate country hence most of the text books are silent about these problems

Acknowledgment

My thanks are due to Prof M P John, F R C O G , Prof of Obsts and Gynae and Dr H B Sinha, M S , M R C O G , Lecturer, Obsts & Gynae , P M C H , for reviewing this case report, and to Dr (Mrs) G Mazumdar, M B , B S , and Dr (Mrs), K Kumari, M B , B S , who helped me in carrying out investigations and follow up of the case I am also thankful to Superintendent P M C H for permission to publish this case

References

1 Bala Subrahmanyam Ind Med Gazette, Vol 84, No 11, 501-2, 1949
2 Bhomik A Ind Med Gazette, Vol 86, No 8, 355-57, 1951
3 Masani Textbook of Gynaecology, 2nd ed , 1957
4 Misra S J of Obst & Gyn , Vol 3, 306, 1953
5 Monson Bahr Text Book of Tropical Diseases, 12th ed , 1945
6 Rose J R , Lancet, April 1, Vol 1, 520, 1946
7 Sen N C Brit Med J , Vol 1, 808, 1049
8 Weinstein B Bernard & Weed John C Am J Obst & Gyn , Vol 56, 83, 1948

Diagnosis and Treatment of Menstrual Disorders and Sterility by Mazer & Israel is an excellent book on the physiology, pathology and treatment of menstrual disorders and sterility It starts with the detail physiology of the pituitary and ovary and describes at length the formation, estimation, interaction and destruction of their hormones as well as their uses in obstetrics & gynaecology

The physiology and especially the endocrine control of menstruation is clearly described The role of androgens in the female is shortly discussed The book contains an elaborate discussion with special reference to the causes, diagnosis and treatment of primary dysmenorrhea, premenstrual tension, migraine and breast hyperplasia as an abnormal manifestation of the menstrual cycle The various causes, diagnosis and treatment of amenorrhea are discussed in a very lucid and instructive manner It contains a wonderful elucidation of the role of thyroid gland adrenal cortex in menstrual disorders by Norman G Schneeberg

Menorrhagia and metrorrhagia caused by organic lesions of the pelvic organs is well discussed The diagnosis and treatment of dysfunctional uterine bleeding of puberty and childbearing age is discussed to the point Premenopausal and post-menopausal bleeding has a separate and well written chapter full of valuable information for the clinician The study of sterility is described in detail considering each of the factors involved Special stress is laid on the male factor in barren marriages and on artificial insemination The aspect of [illegible] in sterility and recurrent abortion is briefly discussed In short, the book is a necessary and very useful volume to a practising gynaecologist and especially to a post-graduate teacher in Gynaecology It contains recent knowledge in endocrinology combined with clinical features and treatment of menstrual disorders and sterility

J D

Clinical Obstetrics and Gynaecology — Vol 3, No 1, March 1960 Pages 264 Paul B Hoeber, Inc, New York

This quarterly publication contains two symposia — (1) Obstetric Emergencies, and (2) Pediatric Gynaecology — edited by Martin L Stone and John W Huffman Obstetricians and Gynaecologists of repute and wide experience have contributed interesting articles to both sections

In the first symposium on obstetric emergencies, stress is properly laid on the importance of being on the alert when faced with any emergency Early recognition and proper management of the complications are emphasized and discussed Though not many obstetricians would support Posner in his suggestion of packing the uterus in cases of post-partum haemorrhage, this measure has a useful place in our country where it may have to be adopted as a last measure in outlying places or where one would like to save the uterus in some patients, or as a temporary measure before resorting to a hysterectomy The chapter on "failed forceps" is too brief One would have expected a more elaborate paper on this important subject

Statistics are bound to differ between our country and the States,

ABRIDGED MINUTES OF THE BIENNIAL GENERAL MEETING OF THE FEDERATION OF OBSTETRIC AND GYNAECOLOGICAL SOCIETIES OF INDIA.

The Biennial General Meeting of the Federation was held at the Calcutta Medical College Calcutta, on Sunday the 1st January 1961 at 4-30 p.m.

2 Dr H. V Tilak, Acting President of the Federation, was in the Chair

3 Delegates from various Memberbodies were present.

4 Before proceeding with the business of the meeting the President appreciated the services rendered by Dr R. K. K Tampan, Dr Mrs D J R. Dadabhoy, Dr Mrs M. J Wadia and Dr S C Bose to the Federation and mourned their loss A resolution of condolences was passed, all standing in silence The President was authorised to send the resolution to their respec tive Societies and to the members of bereaved families

5 In the absence of Dr B N Purandare, Secretary of the Federation, Dr Chamanlal Mehta acted as Secretary and read out the number of members of each memberbodies and the number of delegates each memberbody was entitled to send to the Biennial General Meeting.

6 Minutes of the 10th Biennial General meeting were confirmed

7 The accounts of the Federation for two years ended 30th June 1960 as well as the Report of the Managing Committee for two years were approved.

8 The President narrated the events that had taken place regarding the election of the President and the Vice-President for the years 1963 and 1964 He said that there was difference of opinion regarding the definition of the term "Active Member" and the interpretation of rules 4 (b) and 5 between the Bengal Society and the rest of the Societies. Dr Subodh Mitra Dr Tarun Banerjee, Dr Prabodh Das Dr Bibek Sen Gupta, Dr Sant Ram Dhall, Dr M. K. Menon Dr T V Patel, Dr S B Anklesaria and Dr Chamanlal Mehta took part in the discussion. The President then gave the following ruling —

> "that rule 4 (b) of the Federation was valid and that the additional rule about "Active Member was passed only to bring the terminology of membership in line with the requirements of the International and National Federations The term subscribing members, regular members and active members were synonymous He further ruled that election held by ballot for the President and Vice-President was void and that fresh election be held

In order to avoid misunderstanding in future the following directions were accepted unanimously —

INTERNATIONAL FEDERATION OF GYNAECOLOGY AND OBSTETRICS

The 3rd World Congress

The 3rd World Congress of the International Federation of Gynaecology and Obstetrics will be held in Vienna from September 3 to 9, 1961

The scientific programme will include main lectures, colloquia, fireside conferences and so on

The following subjects will be the topics of discussion —

I Surgical treatment in gynaecology and obstetrics

— Conservative operations of fibroids

— Operations of stress incontinence

— Operations of aplasia vaginae

— Surgical treatment of Carcinoma of the Collum

— Treatment of incompetent cervical os

— Forceps

— Vacuum extractor

— Treatment of breech presentation

— Anesthetics in cesarean section

II The role of the pituitary gland in the physiology and pathology of genital organs

— Diagnosis and treatment in Sheehan's disease

— Treatment with Gonadotropin in anovulatory cycles

— Induction of labour with Pituitrin

THE
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ACCIDENTAL HAEMORRHAGE *

by

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Placenta praevia and premature separation of the normally implanted placenta are universally accepted as the most common causes of antepartum haemorrhage after the 28th week of pregnancy In 1776 Rigley first differentiated between these varieties and he designated the latter as accidental haemorrhage, in contrast to the unavoidable type occurring in placenta praevia In 1881 Chantreuil first noted its association with albuminuria In 1885, Winter associated it with nephritis Holmes, in 1901, suggested the name abruptio placentae for the severe type in which there were abdominal signs and symptoms associated with concealed haemorrhage Various authors have attempted to classify the conditions, some emphasizing the different clinical pictures others on a pathological basis There is thus a wide variation and perhaps this is due to the various aetiological factors, some known, others obscure, which bring about this condition

Incidence

The incidence of premature separation varies greatly from clinic to clinic The reported figures range from 1 in 350 to 1 in 55

During a 2-year-period from July 1957, among 24,634 deliveries after 28 weeks, there were 682 cases of antepartum haemorrhage, an incidence of 1 in 36 Of these, 450 were due to the premature separation, 128 to placenta praevia and 104 unclassified Thus the incidence of premature separation is 1 in 55

*Paper read at the 11th All India Obstetric and Gynaecological Congress at Calcutta in January 1961

"That the memberbody of the Federation shall pay for each of its Active, i.e Subscribing individual, member —

(a) An annual contribution of Rs 12/- or whatever be laid down by the Federation,

(b) An annual contribution of Rs 1/- for each of its members to the Indian Federation or whatever be laid down by the Federation

(c) An annual contribution of Rs 2/50 for each of its members for the subscription of the International Federation or whatever be laid down by the Federation

The President then indemnified the action taken in this respect on the part of any memberbody and the action of the Secretary in the past up to 24th August 1960 when the error was first noticed.

9 The following resolutions were adopted at the meeting —

(a) that the Editor of the Journal be ex-officio member of the Managing Committee of the Federation

(b) that there should be two Honorary Secretaries, one at the office of the Federation and the other at the place of the President.

(c) that the Editor of the Journal is authorised to select articles to be published in extenso from the papers read or submitted at the all India Obstetric and Gynaecological Conference

The rest of the articles be published in the Journal in an abridged form with the author's name and title of the paper at the top

10 Dr B N Purandare and Dr Juliet De Sa Souza were elected Joint Honorary Secretaries and Dr V N Purandare was elected as Honorary Treasurer of the Federation of the ensuing two years

11 Mrs Shirin K Engineer was re-appointed auditor for the Journal and the Federation for the next two years on an honorarium of Rs 100/- per annum

12 It was decided that the 13th All-India Obstetric and Gynaecological Congress be held at Patna, failing Patna it may be held at Nagpur

13 The following subjects were selected for the 13th Congress —

(a) Induction of Labour

(b) Amenorrhoea

(c) Surgical and Psychological Aspects of Sterilization in Women

14 The Federation agreed in principle to the formation of an All-India Academy of Medical Sciences, provided that the opinion of the Federation was sought for in all matters pertaining to obstetrics and gynaecology

15 Dr V N Shirodkar, President of the Federation, Dr S R. Dhall and Dr Subodh Mitra were selected as delegates for the Conference of the International Federation of Obstetricians and Gynaecologists

16 Dr Subodh Mitra and Dr M K K Menon were selected as delegates to the Asiatic Congress of Obstetrician and Gynaecologists to be held at Calcutta in January 1962

mature separation. Gaifami found albuminuria in 80% and eclampsia in 6% Portes found toxaemia in 93 3% and eclampsia in 8 3% In Deickmann's series toxaemia was found in 69% From Glasgow, Munro Kerr reported an incidence of 30% Thus from all sources one is led to conclude that hypertensive toxaemia is the most important factor in the causation of accidental haemorrhage

We have for a long time been struck by a very large number of cases of accidental haemorrhage without any evidence of toxaemia occurring on our service, and we have paid special attention to this factor, as majority believe that hypertension and toxaemia are important aetiological factors In 1952, an analysis of this problem was published and we quote from it the relevant statistics

haemorrhage Thus, in only 19 1% of cases was there any evidence of toxaemia Among 1104 cases of pre-eclampsia treated during the same period, only 50 developed accidental haemorrhage and among the 305 cases of eclampsia premature separation occurred only in 2

Coming to the more recent 2-year-period from July, 1957

Among the 450 cases in 99 hypertensive toxaemia was evident (the term hypertensive toxaemia includes P E.T hypertension, chronic nephritis), an incidence of 22%, while in the remainder there was no evidence of any toxaemia Likewise, among the 1,260 cases of pre-eclamptic toxaemias treated during the same period, there were 56 cases of premature separation, while among 346 eclamptics in the same period there were only five cases of premature separation. All these go to show that while hypertensive toxaemia may be an important aetiological factor, it is not in the majority of cases an essential element and in a large percentage it plays no part

TABLE IV

Year	Total No of deliveries	P.E.T and hypertension	Eclampsia	Accidental haemorrhage
1949	8,334	566	166	178
1950	8 713	538	139	122

TABLE V

Total No of deliveries	Hypertensive toxaemia	Eclampsia	Accidental haemorrhage
24,634	1,260	346	450

Among the 300 cases of premature separation, it was found that only 52 cases showed evidence of toxaemia, the standard of toxaemia adopted for the purpose being albuminuria, oedema, hypertension (over 130/90)

We have not taken presence of albumin alone as evidence of toxaemia as it is now accepted that albumin may be present in the urine after

Thus the associated conditions found in this series of 450 cases are as follows

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that in severe cases of accidental haemorrhage there is a depletion of blood fibrinogen resulting in hypofibrinogenaemia or even in afibrinogenaemia (the so-called acute defibrination syndrome) attention to which had been drawn by Deickmann years ago This lack of fibrinogen results in incoagulable blood and hence severe bleeding Schneider has explained the mechanism by which the blood is depleted of its fibrinogen While one realises that there are various factors, we as obstetricians are concerned with two simple mechanisms (a) the entrance of thromboplastin from the separated placenta and placental site into the maternal circulation through disputed channels which initiates widespread intravascular clotting and thus depletes the body fibrinogen resulting in hypo/afibrinogenaemia Once fibrinogen has reached a critically low level uncontrollable haemorrhage occurs not only from the uterus but also from the nose, mouth and any incisions or needle puncture sites The increased intra-uterine pressure in abruptio placentae is thought to be of prime importance in forcing thromboplastin into the circulation, (b) the production of fibrinolysins which dissolve any clot that is formed This understanding is very essential from the point of view of treatment and in the severe types of accidental haemorrhage it is necessary that the obstetrician should be on the look out for this complication

We do not propose to survey the literature on this subject as it is vast, but intend only to give our experience of the problem

It is extremely difficult to guage the incidence of coagulation defects in accidental haemorrhage Firstly, because of the urgency, the case demands immediate treatment, secondly, one cannot wait for the blood fibrinogen level estimation results which take time and, thirdly, other factors than fibrinogen may be concerned in coagulation failure From the clinician's point of view the two useful bedside tests are (a) the clot observation test, and (b) fibrindex test The former takes time to read, while the latter is the quickest and reliable

Clot Observation Test

5 c c of venous blood is collected in a dry test tube Ordinarily a clot forms within 15-20 minutes and the clot retracts and remains firm at the end of an hour at 37°C In some cases there is no clot formation and in the rest a clot may form but again begins to lyse or disintegrate on shaking This infirm clot could be due to low fibrinogen level or the presence of fibrinolysin

Fibrindex Test

To 0 2 c c of oxalated plasma 0 2 cc of human thrombin solution containing 10 units (Fibrindex) is added and the time for the formation of the clot is noted If clot froms in 5 to 10 seconds and becomes firm in one minute it is suggestive of normal level of fibrinogen in the blood If the level of fibrinogen is below the critical level for haemostasis a gel may be formed in 15 to 20 seconds instead of a clot If no fibrinogen in blood is present, no clot formation occurs even in one minute Unfortunately it is not always possible to obtain the Fibrindex Of the 450 cases in whom the clot observation

TABLE I

Total No of deliveries	No of cases of A.P.H	No of cases of accidental haemorrhage	Placenta praevia	Unclassified
24,634	682	450	128	104
Incidence	1 in 36	1 in 55	1 in 192	1 in 242

Table 1 demonstrates that accidental haemorrhage is the commonest cause of ante-partum haemorrhage in this institution It is not uncommon to come across patients with mild degree of antepartum haemorrhage especially in labour and in whom placenta praevia has been ruled out Majority of these patients do not show any abnormality and labour terminates shortly with the birth of live babies We look for marginal sinus rupture in these cases and, if it is not evident beyond doubt, we register the cases as one of unclassified ante-partum haemorrhage It is quite possible these may belong to the very mild varieties of premature separation

This incidence and study is based upon cases in which there was clinical evidence of separation Cases which were discovered only after delivery of the placenta by the presence of minute retroplacental clots or small organised areas of separated placental tissue have not been included

Parity

This ranged from gravida one to gravida fourteen Forty-two of the 450 were first gravidae, the ratio of primigravida to multigravida being 1 9 7 During the same period the general incidence of primigravida multigravida was 1 3 Premature separation is thus much more common in the multigravida, 228 out of 450 having occurred in the fifth gravida and over

Duration of Pregnancy

It ranged from 28 weeks to term Table III shows the distribution In 66% the separation occurred prior to 36 weeks

Aetiological Factors

Ever since Chantreuil first noted its association with albuminuria, more and more emphasis has come to be laid on pre-eclamptic toxaemia, essential hypertension and chronic nephritis as the prime aetiological factors in the causation of pre-

TABLE II

Gravida	1	2-4	5-6	7-8	9-10	11-12	13-14	Total
Number	42	180	138	54	22	10	4	450

TABLE III

Duration in weeks	28-30	30-32	32-34	34-36	36-38	Over 38	Total
Number	10	64	104	120	90	62	450

Thus, in a series of 125 cases studied in detail the incidence of coagulation failure was 24 8% As is only to be expected, in Grade I cases there was not a single instance of coagulation failure, while in Grades II and III there is the maximum incidence It is observed that, in general, the cases with coagulation failure showed definitely abnormal average values in all the tests bleeding time, clotting time, prothrombin time and fibrinogen level Of the 31 cases which showed coagulation defects by other estimations, in 4 there was no clot formation even at the end of an hour, in 25 a small clot formed which disintegrated easily, and in 2 there was a fairly stable clot By fibrinogen estimation these 4 had afibrinogenaemia

Among the cases that did not demonstrate coagulation failure by other tests, in 8 instances an unstable clot was demonstrable but clinically or haematologically there were no other evidences of coagulation defects

Fibrinogen Levels

The fibrinogen level in normal pregnancy at about term in our series ranged from 288 mgm % to 576 mgm % with an average of 388 mgm. % Opinions differ regarding the critical level of fibrinogen below which bleeding tendencies are manifest When the level in blood falls to less than 150 mgm %, or, according to some, less than 100 mgm %, coagulation failure must be taken as established The table below gives the fibrinogen range in 99 cases of accidental haemorrhage wherein coagulation failure was evident as ascertained by clot observation test

Values given are those of the estimations done prior to start of blood transfusion It will be noticed that of the 99 cases 43 had fibrinogen levels below 100 mgm % Among the 99, there were 6 cases of afibrinogenaemia In 15 patients in whom coagulation was defective as observed by the clot observation test, the fibrinogen levels were over 150 mgm % and in 3 of these it ranged from 250-280 mgm % These were all milder grades of defect We have estimated the fibrinogen in 80 of these patients on the third day of the puerperium after they have survived the delivery In some patients, while initially no obvious clotting defect was noticed during the management, these defects have developed The distribution in these 80 patients are as follows

TABLE XIV

Range	0 50 mgm %	50-100 mgm %	100 150 mgm %	150-250 mgm %	250 mgm.% and over
No of cases	17	26	41	12	3

TABLE XV

Range	0-100 mgm %	100-150 mgm.%	150-200 mgm.%	200-250 mgm.%	250-300 mgm.%	300 mgm.% and over	Total
No of cases	—	—	1	6	49	24	80

test was done, 99 showed coagulation failure of varying degree—an incidence of 22%

We have studied 125 cases of accidental haemorrhage in this series of 450 in detail from the point of view of coagulation failure with the following tests —

(a) bleeding time,
(b) clotting time
(c) prothrombin time
(d) fibrindex test
(e) clot observation test
(f) blood fibrinogen estimations

Of these 125 cases, 31 demonstrated coagulation failure

The 125 cases studied are distributed as follows

TABLE XI

Grades	I	II	III	
No of cases	20	40	65	
No with toxaemia	1	12	15	
No without toxaemia	19	28	50	
No with coagulation defect	—	10	21	Gross average 24 8%
Percentage incidence	Nil	25	32.3	

Blood findings in 31 cases of coagulation defects

TABLE XII

Type		Bleeding time	Clotting time	Prothrombin time	Fibrinogen in mg %
Normal pregnancy 50 cases	Average	43 9″	7′57″	17 6″	388
	Range	20″-1′24″	5′-14′30″	15.1″-20 8″	288-576
Accidental haemorrhage 31 cases	Average	1′03″	10′9″	43″	94
	Range	15″-6′30″	6′30″-15′	17″-5′	0-236

TABLE XIII

Type		Bleeding time	Clotting time	Prothrombin time	Fibrinogen in mg %
Accidental haemorrhage with coagulation failure (31 cases)	Average	1′03″	10′9″	43″	94
	Range	15″-6′30″	6′30″-15	17″-5′	0-236
Accidental haemorrhage without coagulation failure ([illegible] cases)	Average	30.8″		19.8′	267.3
	Range	10 -50′	[illegible]-15	15 7″-23.5″	157-473

types till the delivery is over and if necessary *post-partum* The tubes are marked and taped to the wall near to the patient so that a record of clotting mechanism and response to treatment is readily available

In all cases, after the initial examination is over, the patient is given ¼ gr morphia, a blood transfusion of compatible group blood is set up in all cases except the very mild ones A vaginal examination is done to guage the type of cervix, position and station of the presenting part and in a primigravida to assess the pelvis also Irrespective of any other factors, we rupture the membranes artificially below the presenting part to induce labour An hour or two later, if labour has not commenced, an oxytocin drip is set up, 2½ units in 500 c c of 5% glucose, to commence labour and acceleration of labour Urinary output is recorded every hour, blood pressure and pulse are recorded every half hour If, within 6-8 hours of induction, labour pains are not well established or if progress is slow or if, inspite of sufficient blood transfusion, the patient's condition is not improving or showing a tendency to deteriorate, indicating continuance of the haemmorrhage, caesarean section is done If response to induction is favourable vaginal delivery is awaited The second stage is cut short by outlet forceps All clots are weighed after delivery and coagulation defect looked for post-partum If present, it is treated by blood and plasma transfusions We have no fibrinogen This is in general the management Each case is individualised, assessed and treated on its own merits The treatment employed in 450 cases is shown below

TABLE XX

	No of cases
No treatment, spontaneous delivery	59
Artificial rupture of membranes and vaginal delivery	95
A R M., *oxytocin drip* and vaginal delivery	270
A R. M and oxytocin drip followed by caesarean section	18
Caesarean section	5
Caesarean hysterectomy	3
	450

Vaginal delivery 427
Abdominal delivery 26 Percentage 5.7

A Note on Cases Delivered by Caesarean Section

All 23 cases belonged to Grades II and III, 10 in Grade II and 13 in Grade III In 5, straight caesarean section was undertaken, because of the severity of abruption, haemorrhage was primarily concealed and cervix closed and long, showing unfavourable response to induction In one case there was an early commencing coagulation failure No mother was lost and no babies were saved All were multigravidae

In 18, indication for section was unfavourable response to induction and unsatisfactory response to treatment, i e patient's condition did not show sufficient improvement nor did labour progress satisfactorily, the caesarean section was done in these cases not earlier than 6 hours after a r m and oxytocin drip The longest interval was 18 hours after induction One mother was lost and no babies were saved Among these 18, 2 were primigravidae and 16 multigravidae

Three patients were dealt with by hysterectomy, due to extreme degree

TABLE XVIII

Bleeding/Delivery Interval in 35 cases of Renal Failure

Duration	0-4 hrs	4-8 hrs	8-12 hrs	12-16 hrs	16-24 hrs	More than 24 hours	Total
No of cases	2	nil	10	10	11	2	35

Degree of Oliguria

Of the 35 cases who did not secrete any urine after 8 hours of admission and treatment, 10 recovered and started passing urine within 24 hours of admission, with no special treatment except blood transfusion and induction of labour to empty the uterus These 10 cases, according to Sheehan, could be considered to have minor renal lesions carrying only a low mortality from renal insufficiency Of the remaining 25, 8 died of renal failure and 17 recovered The details are as follows

TABLE XIX

Duration of anuria	0-8 hrs	8-16 hrs	16-24 hrs	24-48 hrs	48-72 hrs	72-96 hrs	96-240 hrs	Total
No of cases	Nil	1	6	8	5	6	6	35

Eight patients among 35 died of anuria, death occurred in 3 patients on the 5th day, in 2 on the 6th, in one on 7th, one on the 9th and one on 10th day The kidneys were available for examination in only 3 cases In two it showed typical cortical necrosis while in one patchy necrosis of a mild to moderate degree was evident Among 2 patients who died, urinary secretion was just commencing on 5th and 6th day In two cases the cause of renal failure was incompatibility of transfused blood Hence the actual mortality from renal failure in accidental haemorrhage in this series is 6

Management

We shall briefly indicate our management of these cases As soon as a patient is admitted with premature separation, the first thing that is done is to take 10 c c of venous blood for clot observation test, fibrinogen estimation and other investigations A general and obstetric examination is then made Special note is made of the uterus, its condition, whether tetany is present or not, tenderness and foetal heart rate The pulse and blood pressure are recorded to assess the degree of shock An indwelling catheter is kept in the bladder and the urine drawn out is examined for albumin, R B C 's and casts Usually, such an examination takes about 20-30 minutes The blood set up for clot observation is now looked into If no solid clot has formed, it is assumed that a coagulation defect has already developed If a clot has formed it is checked up at the end of one hour when the presence of firm well-retracted clot indicates normal clotting If, however, the clot shows signs of lysis or fragmentation on shaking a coagulation defect is assumed We depend upon this test and do it every hour in the severer



of uteroplacental apoplexy and uncontrollable post-partum haemorrhage due to atonicity of the uterus after caesarean section It is well to remember that, while Couvelaire uterus, by itself, is not an indication for caesarean hysterectomy, at times atonic post-partum haemorrhage may co-exist and necessitate a hysterectomy It would be wise to avoid hysterectomy in these badly shocked cases if possible, but it must not be denied if indicated

Coagulation failure of varying grades was present in four cases and caesarean section was done as coagulation defect could not be controlled inspite of blood and plasma transfusion As a last resort, resuscitation was supplemented by hysterectomy One patient was lost One developed anuria but recovered

Comment on A R M and Oxytocin Drip

Controversy exists regarding a r m in cases of purely concealed accidental haemorrhage One school believes, in such cases, to treat the patient for shock and haemorrhage and after she rallies round and uterus regains its tone, as evinced by the bleeding becoming revealed, to resort to induction by a r m or caesarean section They argue that if a r m is done when the uterus is over-distended and atonic, it will only give rise to more internal haemorrhage as the intrauterine tension prior to a r m helps to stablise the haemorrhage There are others who believe that induction by a r m and oxytocin stimulation may result in precipitating coagulation failure in the severe cases, as thromboplastin may be pumped into the maternal circulation by uterine contractions, and hence resort to caesarean section

We believe these objections are more theoretical On the other hand, relieving intrauterine tension by a r m as early as possible may help in not only hastening emptying the uterus but also perhaps prevent coagulation and renal failure Hence we resort to routine a r m in all cases and only in occasional instances resort to straight caesarean section From our experience we have no reason to believe that a r m in such cases promotes more internal bleeding

Induction/Delivery Interval

One of the objections to induction by a r m in the severe variety of cases is that labour may take a long time to start, as in over 60% of cases the abruption has occurred ante-partum and the term premature It is also true that complications are more likely to occur if there is abnormal delay in emptying the uterus With this in view we have analysed the induction/delivery interval in these cases which developed coagulation defects and/or renal failure, and those that did not develop any complications We give below the average in each group

TABLE XXI

Type of complications		Coagulation failure	Renal failure	No complications
Induction delivery interval	Average	3 hrs 43 mts	4 hrs. 2 mts	3 hrs 32 mts
	Range	2 hrs — 14 hrs	1 hr — 13 hrs	30 mts — 12 hrs



vered abdominally, 2 died If the 2 deaths due to incompatible blood are excluded the mortality is 4% Among the 20 deaths, one was in a primigravida

The distribution according to parity and term are shown below

TABLE XXII

Gravida	1	2-4	5-6	7-8	9-10	11-12	13-14	Total
No of cases	42	180	138	54	22	10	4	450
No died	1	4	6	2	3	3	1	20

TABLE XXIII

Term in weeks	20-30	30-32	32-34	34-36	36-38	Over 38	Total
No of cases	10	64	104	120	90	62	450
No died	2	4	8	3	2	1	20

Three factors stand out (i) 75% of deaths are in the 5th gravida and over, (ii) 75% of deaths have also occurred when the abruption has taken place prior to 36 weeks, and (iii) in all 20 patients the premature separation has taken place ante-partum

TABLE XXIV

Cause of death	No of cases
Shock and haemorrhage — including coagulation failure (vaginal deliveries)	9
Renal failure	6
Renal failure due to incompatible transfusion	2
Pulmonary embolism	1
Shock after caesarean section	1
Caesarean hysterectomy and coagulation failure	1

Time of Occurrence of Death

Those dying of renal failure 3 patients died on the 5th day of delivery, 2 on the 6th day of delivery one each [illegible] 7th [illegible] day

Of the remaining 12, death occurred within 4 hours of delivery in 4, in 2 it occurred between 12 and 36 hours, and in 2 it occurred on the 3rd day

It has not been possible to ascertain all the factors involved, especially in these late puerperal deaths due to inability to obtain a post-mortem examination in spite of every effort made

Renal Failure, Its Management

We do not propose to go into it in detail except to state very briefly that we have tried paravertebral block in established cases of anuria without benefit We have relied entirely on modified Bull Joke's regime During the period of anuria, the serum sodium, potassium and blood urea are estimated daily as advocated According to Barry, fibrinogen defects are present in all cases of combined or concealed haemorrhage and minor or moderate degrees of oliguria are present in up to at least 25 to 35% of such cases Sometimes the degree of hypofibrinogenaemia is not sufficient to be detected by a rough test Clinically, a Couvelaire uterus always indicates a severe afibrinogenaemia If urinary secretion does not rapidly

hese cases give rise to more complications The reported incidence of coagulation failure in premature separation varies from 1 in 1000 through 5% to 30-40% according to Jeffcoate and Scott who found in their study that fibrinogen level is reduced to a significant degree in 30-40% of moderate and severe cases of accidental haemorrhage

There is no doubt that with the line of management our results are far from satisfactory The question that is facing us now is how further can we improve? There are two obvious ways

(1) Patient's responsibility to report to hospital with the least possible delay when there is the slightest abdominal pain and spotting O'Donnel Browne has shown that ante-natal care has not reduced the incidence of accidental haemorrhage (2) Hospital responsibility (a) immediate start of treatment, on admission, blood transfusion, amniotomy and oxytocin drip or in select cases caesarean section, (b) an early decision to be taken for caesarean section, earlier than perhaps the 6-8 hours we have till now employed, after induction It might help to reduce the incidence of complications and perhaps reduce maternal mortality

Conclusions

1 We conclude that premature separation is the commonest cause of ante-partum haemorrhage on our service, its incidence being as high as 1 in 55

2 We believe that hypertension and toxaemia have been too long emphasized as etiological factors. In our experience non-toxaemic accidental haemorrhage is more common and as severe and fatal as toxaemic ones

3 In more than 60% of cases the separation starts in pregnancy

4 The prognosis is dependent on (a) the severity of separation as evidenced by shock, uterine tetany and absent foetal heart, (b) the interval between the onset of separation and emptying of the uterus, (c) the availability of enough blood and plasma, also of fibrinogen, (d) the interval between onset of separation and start of treatment, (e) the presence of complications like coagulation failure and renal failure.

5 In our series coagulation failure was demonstrable clinically and by laboratory methods in 99 of 450 cases (22%) and renal failure occurred in 35 of 450 cases, 6 3%

6 There would appear to be a correlation between the incidence of coagulation and renal failure and the abruption/delivery interval

7 In management we have been partial to induction by a r m and oxytocin drip in all types of cases

8 Caesarean section is resorted to if response to induction is poor and the patient's condition is not improving in spite of blood transfusion A decision is taken for caesarean section if response to induction is poor within 6-8 hours, earlier if bleeding persists

9. Coagulation failure, if detected, is dealt with by blood and plasma transfusion

10 Usually, operative delivery is withheld in the presence of coagulation failure until the defect is corrected but in four instances due to poor response we had to resort to caesarean section in the presence of clotting defect

Medical College & Hospital New Delhi, during one year period from August, 1957 to July, 1958 An attempt has been made to estimate the fibrinogen levels in normal non-pregnant and pregnant women, to establish a standard level for comparative study in the abnormal series

The following groups of cases were studied

Non-pregnant	25		
Pregnant (at 36 weeks)	25		
Ante-partum haemorrhage	25		
Toxaemias of pregnancy	10		
Dead foetus in utero	10		
Anaemias in pregnancy	10		
Abortions	10		
Miscellaneous	5	Hydramnios	3
		Vesicular mole	2

These cases were studied on the following lines

1 A thorough history of the patients with special reference to onset, nature and amount of bleeding if any

2 Detailed clinical examination of the patient with special reference to the general condition (shock and collapse if any present), systemic examination for any complicating illness and special examination necessary for the pregnant state

3 Fibrinogen estimation by Biuret method

4 A careful record of the blood pressure pulse and frequent testing of the urine for presence of albumin

5 Amount of haemorrhage ante-partum or post-partum wherever possible

6 Examination of the placenta for evidence of premature separation or [illegible]

Method

Fibrinogen estimation was done using Bosh & Lomb Spectronic 20 by the Biuret method (R)

Procedure 5 c c of blood was drawn from the vein of the patient in a dry sterile syringe and placed in a clean pyrex centrifuge tube containing 0 5 c c of sodium oxalate solution This was centrifuged until clear plasma separated 3 c c of this plasma was then placed in a clean beaker containing 70 c c of normal saline to which 2 6 c c of calcium chloride (2 5%) solution is added The beaker was then incubated at 37°C for half an hour Fibrin clot formed was then removed on a glass rod and dried on absorbent paper The glass rod along with the fibrin clot was then placed in a pyrex centrifuge tube containing 4 c c of 4% sodium hydroxide solution This was then boiled in a water bath till a clear solution was obtained There may be a slight precipitate of calcium oxalate due to the excess of the calcium in the mixture This solution is then centrifuged and the clear fluid is taken 3 c c of this supernatant solution is taken in the special cuvette and 3 c c of Biuret solution added The colour develops almost immediately The reading is taken on the Bosh & Lomb Spectronic 20 at 540 mu within 10 minutes The blank solution is prepared by adding 2 c c of Biuret solution to 3 c c of 4% sodium hydroxide solution The apparatus is set with the blank solution before taking the readings of the unknown solutions The optical density is directly read from the scale and the value calculated from the standard graph (Fig I)

Toxaemia Series A series of 10 toxaemia cases were studied and the fibrinogen level determined in every case The average value obtained was 244 24 mgm %, which compared favourably with the normal pregnant group in which the average fibrinogen content is 245 25 mgm % In no case was the fibrinogen level below 200 mgm % Dieckmann & Schneider report an increase in the average value of fibrinogen in the pre-eclamptic state (average 510 mgm %)

No abnormal haemorrhagic diathesis was noticed in any of the 10 cases One case had twin delivery with post-partum haemorrhage The fibrinogen level in this case was 226 5 mgm %

With respect to the problem of incoagulable blood, as related to pre-eclampsia and eclampsia, a haemorrhagic diathesis is rare While Dieckmann records such an occurrence in eclampsia, he emphasises that fibrinogen levels in this disease are above those of normal pregnant state (660 mgm %)

As pre-eclamptic toxaemia is occasionally associated with accidental haemorrhage, the fibrinogen level, although normal to start with, may become low in labour, when premature separation of the placenta takes place These cases, therefore, need constant observation for signs and symptoms of premature separation of the placenta and frequent check-up of fibrinogen levels when they go into labour

Foetal Death Series

Intrauterine foetal death may lead to hypofibrinogenemia by absorption of amniotic fluid or degenerative products

Ten cases of intrauterine death of the foetus were studied and the average fibrinogen level was found to be 234 9 mgm % In no instance any abnormal haemorrhage was noticed before, during or after labour The maximum duration of loss of foetal movements noticed by the patients in this series was 14 days In 6 patients it was not known There was no case with Rh sensitisation

In two cases the fibrinogen level was below that of the lowest value recorded in the normal pregnant series In one case where the foetal movements ceased 14 days prior to the admission in the hospital, the lowest value of fibrinogen, 151 mgm %, was recorded In the other case where foetal movements stopped 3 days prior to admission the fibrinogen level was found to be 166 mgm % There was no abnormal haemorrhage in any of these two cases Although these values are lower than the values for normal pregnant women these are still above the critical level

Weiner, Reid & Roby made a study of blood from patients with foetal death several weeks in utero prior to labour and found a striking depletion of fibrinogen and some reduction of prothrombin activity, although rarely reaching to a haemorrhagic level Fibrinolytic activity was not demonstrated On the basis of normal liver function tests in these patients, it was concluded that the cause of hypofibrinogenemia is not the result of failure of production of plasma proteins

Diminished fibrinogen is possibly due to the entrance of thromboplastic material from the uterine contents into the maternal circulation causing intravascular coagulation with consumption of fibrinogen A marked

170 0 mgms—309 0 mgms %) Average value at term, quoted by Schneider, Seegers & Stevenson, is 480 0 mgms %

Although the average values of the non-pregnant and pregnant states are considerably lower than the values quoted by the above workers, there is an appreciable rise of fibrinogen in the pregnant state For the purpose of present study, these values will be used for comparison in the abnormal states

Anaemia of Pregnancy Series

No appreciable change in the fibrinogen level was detected in the series of anaemia cases studied Average haemoglobin level was 6 19 mgms % and the average fibrinogen level was 233 015 mgms % Even in cases of extreme anaemia with 2 5 gms % of haemoglobin the fibrinogen level was 218 95 mgm % This further confirms the fact that unless the liver is damaged and there is cause for undue utilization of fibrinogen by intravascular coagulation, these patients do not run the risk of haemorrhage from incoagulable blood The fibrinogen level in every case was found to be well above the haemorrhagic level (Fig III) This may be a part of nature's own protective mechanism against haemorrhage in these anaemic patients

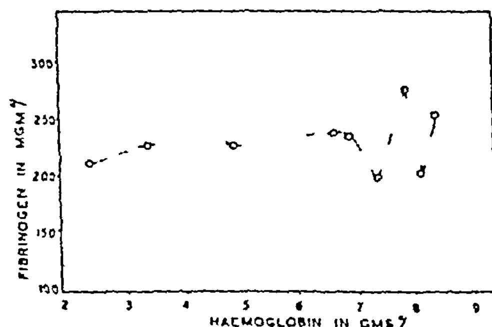


FIG III FIBRINOGEN CONTENT IN ANAEMIA CASES WITH PREGNANCY

It must be kept in mind that these patients may suffer from preeclampsia superimposed on the anaemia as well, and in case they do develop premature separation of placenta during labour their chances of recovery are much less than those in patients with normal haemoglobin level.

Abortion Series In this series, 10 cases of abortion were studied, 3 cases were of threatened abortion and 7 cases of incomplete and inevitable abortion The average value of fibrinogen content was below that of normal pregnant woman All the 10 cases were in the first trimester of pregnancy The average fibrinogen level in normal pregnancy was studied at the 36th week The normal value for the first trimester was not established and hence a fair comparison is not possible

The average fibrinogen level in this series was found to be 187 03 mgm % (range 135-232 mgm %) In 2 cases the fibrinogen level was found to be lower than the lowest value recorded in the normal pregnant series (170 3 mgm %) One was a case of inevitable abortion where evacuation of the pregnant uterus was done and the other was a case of complete abortion at the 14th week of gestation Fibrinogen levels were 135 9 and 143 45 mgms % respectively

The haemorrhages in certain cases are no doubt excessive, but it is not definitely due to an incoagulable state of the blood as the fibrinogen levels, although generally low, are still well above the haemorrhagic level

concealed or revealed, and post-partum was encountered in 7 cases There was severe ante-partum haemorrhage seen externally twice only and continued post-partum haemorrhage in 2 instances In rest of the cases, only large amount of retroplacental clots were found In 3 out of 5 severe cases, the fibrinogen level was below 100 0 mgm. %

Fibrinogen Level In Table II it will be noted that the fibrinogen level in all the mild cases was well above 200 mgm % In one patient the fibrinogen was 211 mgm % and there was appreciable antepartum haemorrhage with retroplacental clots She was delivered of a still-born infant All the cases showed evidence of premature separation of the placenta Although delivery was not hastened by any artificial measures, these patients did not go into a state of shock nor was there any evidence of severe internal haemorrhage

In the moderate variety of cases the fibrinogen level still remained above 200 mgm %, but mild degree of shock was noticed in both the cases and both had pre-eclampsia None required blood transfusion Both these cases had large amount of retroplacental clots, but no appreciable depletion in the fibrinogen level was noticed

In 3 out of the 5 severe cases, the fibrinogen level was below 90 mgm % It appears from Table II that the state of marked defibrination which occurs in the severe cases tends to continue until the uterus is emptied

The tendency to excessive bleeding was present in all the severe cases In one of the severe cases four-hourly determination of fibrinogen showed no appreciable rise in the fibrinogen level, in spite of administration of 1000 c c of whole blood transfusion and one unit of human plasma, till delivery was completed, the fibrinogen level rising spontaneously after delivery and reaching the normal level In 3 out of the 5 severe cases 1000 c c of fresh whole blood transfusion was necessary to enable the patient to stand the strain of delivery Fibrinogen levels returned to normal once delivery was completed In one severe case the patient had a large bout of external haemorrhage, the size of the uterus increased from 24 to 28 weeks' of pregnancy and the patient went into a state of shock Fibrinogen level detected at this time was 37 75 mgm % She was given 1000 c c of fresh whole blood transfusion and abdominal hysterotomy was done to empty the uterus rapidly During the operation, the placenta was found completely separated lying in the lower segment and the whole uterus was full of dark blood clots The foetus of course was dead Her condition improved steadily and the fibrinogen returned to normal In one case where the fibrinogen level was 110 mgm % before delivery, she had large amount of retro-placental clots, and post-partum haemorrhage for 2 hours, which was controlled by the usual measure without any blood transfusions The fibrinogen level repeated 12 hours after delivery recorded a normal value

It appears, therefore, that the mild cases, if kept under observation do not need any special treatment and the fibrinogen level remains within normal limits

degree of autolysis of decidual and placental tissue is a pre-requisite to the production of this syndrome

Placenta Previa There were 13 cases of placenta previa in this series The average fibrinogen level was found to be 231 52 mgm % The lowest value recorded in one case was 173 65 mgm % All the cases were admitted with profuse haemorrhage requiring immediate interference in 6 cases, whereas 2 cases responded to conservative treatment The haemorrhage in this series is definitely not due to an incoagulable state of the blood, as the blood clots readily and there is no evidence of any hypofibrinogenemia

Accidental Haemorrhage Series

There were 12 cases of accidental haemorrhage in this series

Mild cases are those in which there are no symptoms or signs other than slight vaginal bleeding, generally diagnosed only in retrospect after inspection of the recently delivered placenta

Moderate In these cases there might be slight hypertonicity of the uterus and moderate vaginal bleeding with mild or no shock

Severe cases are those in which there is shock, the uterus is tender, distended and of board-like consistency, and no foetal heart sounds can usually be heard Bleeding may be revealed, concealed or of mixed variety, and shock is usually out of proportion to the external haemorrhage seen, if any

Frequency of Toxaemia 50% of the cases had signs and symptoms of pre-eclamptic toxaemia Two patients were admitted in a collapsed state where the blood pressure could not be recorded at first, but gradually rose to above normal limits after recovery Three patients had albuminuria and hypertension and one case had oedema and hypertension Two patients had hypertension only Six patients showed no signs or symptoms of toxaemia

Age and Parity Six patients were between 21-30 years of age, 5 were between 31-40 and one was above the age of 40 years The highest parity recorded in this series was ninth Eight cases were recorded as 6th gravida and above

Duration of Gestation It was noticed that the maximum number of cases occurred at 36th week of pregnancy This can be explained by the fact that the placenta is mature, thus needing very little stimulation for separation from the uterine wall Therefore, any stimulating factor whether chemical or physical, as toxaemia, hypertension, foetal movements, sudden rupture of membranes, falls, etc , may cause this condition

Foetal Mortality Rate There were 75% still-births in the present series In the mild variety there were 40% live births and 60% still-births In the moderate and severe groups foetal mortality was found to be 91 7%

Clincial variety	No of cases	Live foetus	Still-birth
Mild	5	2	3
Moderate	2	1	1
Severe	5	0	5

Percentage of foetal mortality = 75

Maternal Mortality In this series no maternal death was encountered

Haemorrhage Clinically, moderate amount of haemorrhage, antepartum

In the moderate group the fibrinogen level, to start with, may be normal but if permitted to continue may defibrinate the patient to a critical level In these patients delivery should be encouraged and repeated fibrinogen determination should be done As long as the fibrinogen level remains at 150 mgm % or above, the patients do not run a risk of haemorrhage from incoagulable blood But if the delivery is delayed too long and the fibrinogen level shows a tendency to drop, as is seen in one of the severe cases (K K 5339), rapid measures to correct the coagulation defect and hasten delivery must be undertaken

In the severe group of cases, marked haemorrhagic diathesis was present in all the cases where the fibrinogen level was below 90 mgm % In this study, therefore, it appears that haemorrhage due to hypo-fibrinogenemia is encountered when the fibrinogen level falls to 90 mgm %, or below When the fibrinogen level falls to 150 mgm. %, repeated determinations are indicated to avoid this catastrophe, if the patient comes under observation early Often the patients are admitted in the state of shock with severe concealed or revealed haemorrhage, where prevention of this condition is not possible However, once the source of thromboplastin, the placenta, is removed, the fibrinogen level returns to normal within 2-3 hours, while undelivered the patient is in constant danger of haemorrhage from incoagulable blood

√Management

The management of accidental haemorrhage or premature separation of placenta continues to differ from clinic to clinic The majority of the patients who die from this complication do so from immediate and extensive blood loss, while the remaining deaths usually follow renal and pituitary damage The fundamental disturbance is a reduction in circulating fibrinogen to a haemorrhagic level. The hypofibrinogenemia has been observed only in the most extensive forms of premature separation Once the patient is safely delivered, the coagulation components do not decline further In fact this suggests the transient nature of the haemostatic disturbance The other derangement of normal physiology noted is the development of hypertonus of the uterine musculature which may reach such a degree that intermittent expulsive contractions may become undetectable to palpation This is most apt to happen in complete separations and accounts for the hard uterus

1 *Preventive*

This is here considered in relation to the treatment of accidental haemorrhage in which the fibrinogen is reduced to a significant degree in the moderate and severe groups where a further lowering to the haemorrhagic level can be prevented

(a) Artificial Rupture of Membranes

This should be done as a matter of urgency in all cases The patient should be taken to the operating room for an internal examination, to exclude placenta previa, to determine the state of the cervix and do artificial rupture of the membranes Rupture of the membranes reduces intra-uterine pressure When prema-

TABLE II

Analysis of Clinical States, Treatment and End Result in 12 Cases of Accidental Haemorrhage

Cases	Term of pregnancy	Degrees of shock mild	mod	severe	Pre-eclampsia	Hge Diathesis	Fib	Total blood given	Interference	Delivery Vag	Abd	Survival Mother	nfant
Mild													
R S 4396 K	30 weeks	Nil			+	+	211 4	0	Nil	+	—	Yes	No
4467 R K	32 "	Nil			0	0	268 02	0	ARM	+	—	Yes	Yes
5009 K	28 "	Nil			0	0	332.2	0	Nil	+	—	Yes	No
4427 R R	30 "	Nil			0	0	256 7	0	Nil	+	—	Yes	No
5329	35 "	Nil			0	0	279.35	0	Nil	+	—	Yes	Yes
Moderate													
R P 4693 K	36 "	+	—	—	+	+	234 04	0	Nil	+	—	Yes	No
4989	36 "	+	—	—	+	++	241 6	0	Nil	+	—	Yes	Yes
Severe													
K K. 4421 S	34 "	—	+	—	+++	++	151 0	0	ARM	+	—	Yes	No
4912 R P	32 "	+	—	—	++	+	110.8	0	ARM	+	—	Yes	No
4182 K. K.	36 "	—	—	+	+	++	30 2	1000 cc	ARM	+	—	Yes	No
5339 C D	36 ,	—	—	+	Collapsed	++	84 05	"	ARM	+	—	Yes	No
4481	24 ,	—	—	+	"	++	37 7		—	—	+	Yes	No

be used to tide over the critical period, so that the patient can stand the delivery before she goes on to the haemorrhagic state This tragic state has been described by Kellogg when, in speaking of transfusing continuously and treating 'conservatively' a severe case, he said, "This has on occasion led to that unpleasant situation in which more and more foreign blood has been given to a patient only to be washed out in what remains of the patient's own blood, her condition being such that one does not dare to stop the transfusions" Conservative treatment definitely has a place in the mild variety of the cases where the patient's general condition remains good and the foetus is alive and the bleeding does not warrant any active measures However, repeated determination of fibrinogen levels and close observation of the patient's general condition is necessary to determine the optimum time for interference

2 *Curative*

If coagulation failure does develop, fibrinogen replacement may be necessary Transfusion of whole blood contributes 0 4 gms % of fibrinogen if blood is fresh and 0 3 gms % if blood is stored Best results are obtained by rapid administration of fresh citrated whole blood (Where fibrinogen is readily available, it is often used when not indicated Because of the risk of homologous serum jaundice, definitive treatment should be whole blood) Where fibrinogen preparations are not available, dried plasma can be used This retains a high fibrinogen content even if stored for as long as 3 years, and, if it is reconstituted to double strength, provides a solution containing approximately 0 7 gms % of fibrinogen. One or two pints of this is sufficient to enable the patient to survive the crisis in the majority of cases In the present series of cases fresh whole blood and dried human plasma were used freely whenever called for

It was not found necessary to use isolated fibrinogen in any of the cases including 3 cases of severe abruption where fibrinogen was well below the haemorrhagic level The situation corrected itself rapidly after delivery

Fig IV is a graph showing the fibrinogen levels in a case of severe accidental haemorrhage Patient K K 5339, 7th gravida, 36 weeks pregnant was admitted on 9th June, 1958, at 4 p m presenting a clinical

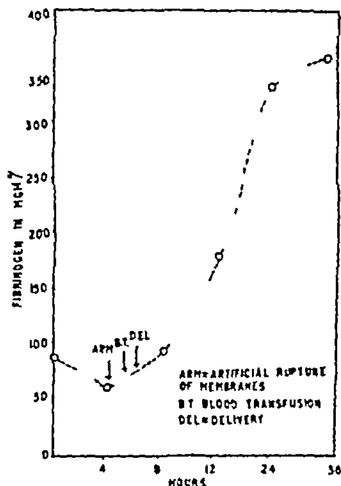


FIG IV FIBRINOGEN LEVELS IN A SEVERE CASE OF ACCIDENTAL HAEMORRHAGE

ture separation of the placenta takes place, there is a rise in the intrauterine pressure when the retroplacental clots attain any appreciable size When the intra-uterine pressure exceeds the pressure within the venous sinusoids at the site of placental detachment, the coagulant materials are forced into the latter blood channels as the result of the pressure difference As long as the membranes remain intact, the intrauterine pressure is maintained and probably increases with further retroplacental bleeding It has been demonstrated by blood studies that rupture of the membranes has an almost immediate effect on coagulation It, moreover, brings on and quickens labour, and helps to control the amount of retro-placental bleeding

(b) Rapid Emptying of Uterus

One of the objects of rupturing the membranes is to ensure rapid delivery of the foetus and placenta Oxytocin is often given in these cases and there are arguments for and against it It is advantageous in that it quickens delivery, it is disadvantageous in that, by raising intrauterine pressure, it may drive thromboplastin into the circulation

Caesarean section has the merit of ensuring even more rapid delivery than that mentioned above, and, in certain cases, it may even save the life of the baby If coagulation failure is already present, however, it is dangerous Caesarean hysterectomy is probably never necessary

Hysterectomy transfers the bleeding tendency to areas outside the body of the uterus, namely the ovarian pedicle, cervical stumps and the incised parietal and visceral peritoneum Oozing or active bleeding from these areas, irrespective of ligatures, have been noticed

In this series, eleven cases had vaginal delivery and only one case called for an abdominal hysterotomy Six cases were in active labour when first seen, and in five cases artificial rupture of membranes was done to induce labour as well as to reduce the intra-uterine pressure Oxytocin was not used in any of the cases Abdominal hysterotomy was resorted to in one case as the cervix was tightly closed and the patient's condition called for active immediate emptying of the uterus

(c) Replacement Therapy

When the patient is shocked and the condition calls for intravenous fluids, fresh whole blood transfusion is indicated The amount of the blood to be given depends on the amount of blood loss which is difficult to estimate

(d) Conservative Treatment

It is believed that as long as the placenta is retained in the uterus, there will be constant depletion of the fibrinogen in the blood The fact that the abruption state appears to cause continuous utilization of blood coagulation factors, (fibrinogen), the major portion of the load of continuous replacement of fibrinogen falls on the patient's own resources

It is possible that after several hours these resources may come to exhaustion and may not be able to meet the heavy demand of the situation Since blood transfusion is sufficient to meet only a small portion of this demand, blood should rather

values published in the American literature

Although the values of fibrinogen in the plasma are lower than those reported by other workers, there is an appreciable rise in pregnancy

The critical level is said to be 100 mgm % of fibrinogen In the series studied, even though the average value is much lower than quoted by Schneider & Dieckmann, the critical level was almost the same, 90 mgms %) Cases of accidental haemorrhage were studied in detail and were grouped as mild, moderate and severe The mild and moderate groups showed fibrinogen levels of above 200 mgm % whereas in the severe cases marked depletion of fibrinogen was noticed, the lowest value recorded being 37 7 mgm % From the results of treatment of these cases it may be concluded that the mild and moderate varieties do not need any active treatment whereas in the severe variety replacement of fibrinogen and measures for expulsion of the products of conception has to be resorted to as an essential part of the treatment The clinical picture in these cases is a useful guide to the treatment irrespective of whether the plasma fibrinogen level can be estimated or not

Summary

Blood plasma fibrinogen determinations were performed on 115 cases

(1) Average values for normal non-pregnant and pregnant women at 36th week were established to compare with the abnormal series studied

(2) Average blood plasma fibrinogen level in cases of accidental haemorrhage was found to be 177 9 mgm % No appreciable haemorrhagic diathesis was noticed in cases where the fibrinogen level was above 90 0 mgm %

(3) Average fibrinogen level in foetal death series was found to be 234 92 mgm % No abnormal haemorrhagic diathesis was noticed in the series of ten cases studied

(4) No appreciable change in the fibrinogen level was noticed in the toxaemia series studied

(5) No appreciable change in the fibrinogen level was noticed in the anaemia series studied

(6) Average fibrinogen level in the abortion series was 187 03 mgm. % which is below the average value of normal pregnancy studied at 36th week. Fibrinogen level in the first trimester of pregnancy was not studied for comparison

(7) Case report of a severe case of accidental haemorrhage with hypo-fibrinogenemia is given in detail

(8) Management of cases, where hypofibrinogenemia is suspected, is given in detail

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References

1. Barnett V H & Casson C A Brit Med J 2, 676, 1954

picture of concealed accidental haemorrhage Two hours after admission, she had moderate amount of revealed haemorrhage

In this patient an initial diagnosis of concealed accidental haemorrhage was made due to the positive signs and symptoms of internal haemorrhage, associated with a hard and tender uterus and constant abdominal pain The haemorrhage became revealed 2¼ hours after admission and from this fact it was concluded that the uterus was actively contracting It was, therefore, considered desirable to do a pelvic examination in the theatre Vaginal examination revealed cervical dilatation of only 1/5th, and placenta was not felt Low artificial rupture of membranes was done and the liquor was found blood stained It may be noted here that although she had abdominal pain for 9 hrs before the pelvic examination, the dilatation of the cervix was only 1/5th, even though she was a multiparous woman It is presumed that the abdominal pain was more due to the internal haemorrhage than actual labour pains

Labour progressed satisfactorily One hour after rupture of the membranes, she had spontaneous delivery The placenta followed almost immediately after the baby without any attempt at expressing

Blood transfusion was started before delivery took place and every needle puncture was followed by a haematoma She had a total of 1000 c c of fresh whole blood and 500 c c of human plasma

Fibrinogen content of the plasma determined at 5-30 p m, before any blood transfusion, was 84 05 mgm % which is below the critical level of 90 mgm % A further drop to 60 mgm was noticed at 9-30 p m

After delivery and blood transfusion, there was a steady rise in the fibrinogen level (Fig IV)

This rise in the fibrinogen was probably due to the replacement therapy and partly by the patient's endogenous resources after the expulsion of the placenta

It may be mentioned here that even if facilities for fibrinogen estimation do not exist in an obstetric unit, termination of pregnancy preferably by the vaginal route and replacement therapy by blood transfusion and plasma is the logical line of treatment with gratifying results

Conclusion

The average fibrinogen level in the normal non-pregnant and pregnant woman was found to be 170 03 mgm % and 245 0 mgm % respectively, which is much lower than the

Date	Time	Fibrinogen in mgm %	Remarks
9-6-58	5-30 p m	84 05	Before delivery
"	9-30 p.m	60 4	At the time of delivery
10-6-58	1-30 a.m	90 6	After delivery & blood transfusion
"	8-00 a.m	188 7	1000 c c & Plasma
"	12 noon	377 5	" 500 c c
11-6-58	8-00 a.m	388 55	"

2 Bartholomew R A, Colvin E D, Grimes William H, Fish J S and Laster W M Am J Obst & Gyn, 62, 2, 1951
3 Bartholomew R A, Colvin E D Grimes William H & Fish J S Am J Obst Gyn, 57, 1, 69, 1949
4 Bhattacharyya G Thesis, University of Delhi, 1958
5 Biggs R & Macfarlane R G "Human Blood Coagulation and Its Disorders", Blackwell, London, 1953
6 Dieckman W J Am J Obst & Gyn, 31, 734, 1936
7 Eames D H Am J Obst & Gyn, 64, 201, 1952
8 Earn A A & Nicholson D Am J Obst & Gyn, 63, 1, 1952
9 Eastman N J La Prophylaxie en Gynecologie et Obstetrigne, Librairie De L' Universite Geogrge, Geneve, 1954
10 Fish John S, Bartholomew R A., Colvin E D and Grimes William H Am J Obst & Gyn, 6, 20, 1951
11 Gross P & Benz E J Surg, Gyn, Obst, 85, 315, 1947
12 Hartmann R C, Conley C L and Krevans J R J Clin Invest, 30, 948, 1951
13 Hemmings C T Am J Obst & Gyn, 53, 303, 1957
14 Jeffcoate T N A and Scott J S Jour of Obst & Gyn of India, 6, 267 1956
15 Johnson J F, Seegers W H, and Braden R C Am J Clin Path, 22 322 1952
16 Kellogg Foster S Obst & Gyn Surv 3 746 1948
17 Kimbrough R A and Jones B D Am J Obst & Gyn, 55, 496, 1948
18 Levin R & Brauer R W J Lab Clin Med, 38, 474, 1951
19 Mac Farlane R G and Biggs Rosemarry Blood, 3, 1167, 1948
20 Mac Farlane R G and Pilling J Lancet, 2, 562, 1946
21 Makay D G, Meril S J, Weiner A E, Hertig A T & Reid D E Am J Obst & Gyn, 66, 507, 1953
22 Moloney W C, Egan W J and Gorman A J New England J Med, 240, 596, 1949
23 Page Ernest W, Fulton Lee D, Glendening and May Beth Am J Obst & Gyn, 61, 116, 1951
24 Ratnoff O and Manzie C J Lab & Clin Med, 37, 316, 1951
25 Ratnoff Oscar L, Laustin Carl F, Shall John G and Schilling Myron O Am J Med, 13, 111, 1952
26 Reid D E, Weiner A E and Roby C C Am J Obst & Gyn, 66, 465, 1953
27 Reid Duncan E, Weiner Albert E and Roby Charles C J A M A, 152, 227, 1953
28 Schneider C L Surg, Gyn & Obst, 90, 613, 1950
29 Schneider C L Am J Obst Gyn, 564, 141, 1952
30 Schneider C L Surg Gyn Obst, 92, 27, 1951
31 Sexton L I, Hertig A T, Reid D E, Kellogg F S and Patterson W S Am J Obst. & Gyn, 59, 13, 1950
32 Stefanine Mario Am J Med, 14, 64, 1953
33 Weiner A E, Reid D E & Roby C C Am J Obst & Gyn, 60, 379, 1950

TABLE I

Accidental Haemorrhage (General Survey)

Name of Hospital with period	Admissions	Deliveries	Cases of accidental haemorrhage	Accidental haemorrhage incidence
Rotunda Hospital				
(i) Under Falkner	—	28,195	147	0.5%
(ii) Under Browne	—	15,928	100	0.5%
New York Lying-in (1932 54)	—	71,826	398	0.55%
Maternity Hyderabad	42,037	30,848	161	0.56%

Table I shows a comparative statement of figures published for the Rotunda Hospital under its former Masters, Falkner and Browne, and those obtained at New York Lying-in Hospital for 1952-54 given by Gordon Douglas At Government Maternity Hospital, Hyderabad, there were 42,037 obstetric admissions and 30,848 deliveries (booked and unbooked) during the 3 year period under study The incidence of accidental haemorrhage was 0 56 per cent and this compares well with the figures published from Dublin and from New York

Methods

Before analysing in detail the results of the 161 cases of accidental haemorrhage, a word as to the general plan of approach in the management of a case suspected of premature separation would perhaps be not out of place here

A careful clinical assessment of a case is made as to the degree of pallor and shock, presence of any tenderness of the uterus and finally as to the condition of the foetus Estimation of patient's haemoglobin is done and her blood grouping is determined A sample of venous blood is taken for "clot observation test" A catheter is left *in situ* and released hourly A careful record of fluid intake and output is maintained The clot observation is

TABLE II

Incidence of Accidental Haemorrhage at Government Maternity Hospital Hyderabad

Year	Deliveries total	Cases of accidental haemorrhage	Accidental haemorrhage incidence
1957 (latter half)	6,223	38	0.59%
1958	11,161	49	0 43%
1959	8,871	47	0.53%
1960 (earlier half)	4,593	27	0.58%
3 years total	30,848	161	0.56%

Table II shows the annual figures for the hospital at Hyderabad for each of the 3 years from July 1957 to June 1960 The incidence appears to be remarkably constant throughout this period

EXPERIENCES WITH 161 CASES OF ACCIDENTAL HAEMORRHAGE AT HYDERABAD *

by

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Today, with the improved facilities available to the obstetrician in the form of a blood bank, a multitude of antibiotics and hypotensive drugs, among other things, the risks associated with caesarean section, puerperal fever and eclampsia are gradually on the decline Hence it is not unnatural for us, in the course of such important trends, to be facing menace from certain other quarters Here, we refer to the condition of accidental haemorrhage with all its sinister complications

The concept of accidental haemorrhage originated with Edward Rigby who, in 1776, clearly differentiated the accidental from the unavoidable type of antepartum haemorrhage Baudelocque, in 1819, Goodell in 1869 and Holmes in 1901 made every effort to crystallize the clinical picture of a case of premature separation of the normally situated placenta In more recent times, authentic figures on the incidence of accidental haemorrhage and other detailed information on the outcome for the mother and infant for the past few decades had come from the Masters of the renowned Irish Hospitals (Browne and Barry *et al*) Needless for us to add that also in recent years several American workers have made outstanding contributions by drawing attention to the peculiar state of clotting defect that might develop during the course of accidental haemorrhage (Weiner *et al*, Schneider) At about the same time Sheehan and Moore, Trueta *et al* and Sophian had published their valuable studies on various aspects of renal involvement in accidental haemorrhage

*Paper read at the 11th All-India Obstetric and Gynaecological Congress at Calcutta in January 1961

Material

Now, while awaiting figures from the various observers in this country to be made available, permit us to compare the incidence and results, from the 400 bedded obstetric and gynaecological cases from the Government Maternity Hospital at Hyderabad, with some of the large statistical data presented from abroad

Table VI shows that toxaemia in some form or other was present in 62 per cent of cases of accidental haemorrhage It is obviously the major aetiological factor

tended uterus When the abdomen was opened a remarkably extensive Couvelaire uterus was present The peritoneal layer was found to be giving way in places Hence it was

TABLE VII

Management of Accidental Haemorrhage in 121 Cases

Year	A.R.M	A.R.M. pitocin drip	Pitocin drip	Caesarean section
1957 (latter half)	20	—	2	3
1958	10	8	4	8 (1 C Hysterectomy)
1959	6	20	—	5
1960 (earlier half)	8	10	4	3
3 years total	44	38	10	19

The management in 158 cases of accidental haemorrhage is detailed in Table VII. Artificial rupture of membranes alone was carried out in 44 cases Artificial rupture of membrane followed by a physiological pitocin drip had been adopted in 38 cases In 10 cases where the membranes were absent, a drip alone was found to be sufficient Fifty cases went into labour spontaneously and delivered themselves Most of the spontaneous deliveries included those group 'O' cases where the retroplacental clots were discovered only on routine examination of placenta. Out of the 139 vaginal deliveries there were 133 that were spontaneous, 3 forceps deliveries, 2 breech deliveries, and one craniotomy In 19 cases the delivery was resorted to by the abdominal route Eighteen caesarean sections had been carried out, and one caesarean hysterectomy This last case was extremely anaemic with a pulse rate well over 160 per minute, and a typically tender and enormously distended uterus

decided to do a quick hysterectomy realising that only this procedure would leave behind the smallest site from which any bleeding could occur Although the clotting defect had been corrected, the patient was so ghastly anaemic that any further loss seemed as if it would tip the balance As soon as the uterus was removed



repeated every hour until the patient is delivered and for 2 hours thereafter if there is a suspicion of clotting defect

The mode of delivery was decided upon depending on the severity of the condition If the patient is not in active labour, its onset was hastened by a r m with or without a physiological pitocin drip A drip alone was sufficient on several occasions Abdominal delivery was resorted to only when certain complications demanded an early emptying of the uterus Such indications arose with an occasional case of foetal distress but more often because the patient failed to go into labour within a short period of induction

When any of the patients developed clotting defect, they were transfused with 2 or more units of fresh blood as well as double strength reconstituted human plasma

Results

The 161 cases of accidental haemorrhage have been analysed and graded according Page's classifications in Table III This grouping was found to be helpful because the cases showing retroplacental clots, noted only after delivery, could be included as Grade 'O' Most of these had caused neither antepartum haemorrhage nor any other defect

TABLE IV
Age Group and Accidental Haemorrhage

Age group	No of cases
15-24 years	34
25-34 years	107
35-45 years	20

Table IV indicates the distribution of cases according to age groups By far the largest number of cases were found between 25-34 years of age

TABLE V
Primigravidae vs Multigravidae

Year	Primigravidae	Multigravidae
1957 (latter half)	4	34
1958	6	43
1959	6	41
1960 (earlier half)	6	21
3 years total	22	139

Table V clearly shows that the large majority were multigravidae The primigravidae formed only 1/8th of total number of cases of accidental haemorrhage

TABLE VI
Incidence of Associated Toxaemia

Year	Cases of accidental haemorrhage		Toxaemia percentage
1957 (latter half)	38		51 4
1958	49		57.2
1959	47		68 0
1960 (earlier half)	27		71 4
3 years' total	161	Average	62 0

TABLE III
Grades of Accidental Haemorrhage

Year	Grade '0'	Grade I	Grade II	Grade III
1957 (latter half)	3	12	15	8
1958	9	14	16	10
1959	3	13	20	11
1960 (earlier half)	6	7	6	8
3 years total	21	46	57	37

TABLE X

Foetal and Maternal Mortality (Comparative Statement)

Name of the author	Deliveries total	Number of cases	Maternal deaths	Perinatal mortality
Browne	15,928	100	7 (7.0%)	77.5%
Douglas	71,826	398	5 (1.2%)	34.7%
Porter	54,286	283	5 (1.8%)	63.1%
Present series	30,848	161	7 (4 4%)	56 6%

No study on any series of accidental haemorrhage will be complete without a reference to the maternal deaths Table X shows a comparative picture of maternal and perinatal mortality There were 7 maternal deaths in the total of 161 cases giving an incidence of 4 4 per cent Of these 7 cases, only one belonged to Grade II, while all the others had been classified as Grade III All the deaths were among multigravidae, one being a young second gravida aged 16, while the others had delivered 5-8 times before this pregnancy and were round about 30 years of age

Of the 7 cases, 5 were not in labour on admission and one had been in the first stage for 6 hours In the 7th case, who had been admitted in a state of severe shock, the os was fully dilated and she was found to be bleeding away because of hypo-fibrinogenaemia

Marked state of shock at the time of admission as such was noted in 4 patients among those who died Another case had been admitted with anuria and died of anuria One was admitted for eclampsia who later developed accidental haemorrhage The Grade II case developed uncontrollable postpartum haemorrhage possibly due to hypo-fibrinogenaemia

Summarising in Table XI, 4 deaths were due to hypo-fibrinogenaemia, one was due to renal failure One death occurred from cerebral thrombosis 48 hours after delivery The seventh one died suddenly during the course of the pitocin drip presumably of amniotic embolism

TABLE XI

A Review of Maternal Deaths at Govt Maternity Hospital Hyderabad

		Causes of deaths		
Total cases	161	Hypo-fibrinogenaemia		4
		Couvelaire uterus	3	
		Postpartum bleeding	1	
Total deaths	7	Renal failure		1
		Cerebral thrombosis		1
		Amniotic embolism?		1

(and this was done without delivering the foetus), her condition began to improve rapidly and the pulse rate steadily dropped to 120 per minute She went through a satisfactory post-operative course (See Fig)

TABLE VIII

Duration of Labour

Cases	Duration of labour
134	6 hours
17	6 hours
6	12 hours
1	18 hours

Table VIII shows the duration of labour in 158 cases Only in 7 cases did the labour last more than 12 hours There were 3 deaths in this group while only one woman among those who had shorter labours lost her life

appeared after admission Three women, who had no foetal heart on admission, died undelivered An incidence of 56 6 per cent represents overall perinatal mortality from all grades grouped together Of course none of the foetuses in Grade III could be salvaged

Besides this large number of still-births and neonatal deaths that had occurred, the other complications of accidental haemorrhage were maternal shock, hypo-fibrinogenaemia and renal failure Ten mothers suffered from severe degrees of shock in the postpartum period The quantity of retro-placental clots had varied from 60 ml to 1200 ml Twelve mothers exhibited signs of hypo-fibrinogenaemia, half of them did so by overt vaginal bleeding Thirty-nine blood transfusions

TABLE IX

Perinatal Mortality Associated with Accidental Haemorrhage, 158 Cases

Year	Macerated	Stillbirths	Neonatal deaths	Perinatal loss
1957 (latter half)	—	11	1	60 0%
1958	8	18	—	53 06%
1959	1	29	2	63.8%
1960 (former half)	2	12	1	51.8%
3½ years total	11	70*	4	56 6%

* Foetal heart was present in 11 cases on admission

Perinatal mortality as met with in the 158 cases of accidental haemorrhage is shown in Table IX The fluctuation in the figures for the 3 year period under study does not permit any improvement to be appreciated in the latest half year Seventy cases had been admitted with no foetal heart sounds In 11 cases the foetal heart sounds had dis-

had been carried out Twelve plasma infusions were resorted to either because the clot observation had indicated it or because the blood that escaped from the vagina failed to clot Five patients out of the whole series developed renal failure Paravertebral block in one and Bull Joakes regime in 3 cases were adopted

Further details of the deaths in the series are tabulated in Table XII, and also narrated below

Case 1 R A was admitted with a moderate degree of shock She was in labour and delivered soon after admission but died of uncontrollable P.P.H possibly due to hypo-fibrinogenaemia

Case 2 S A was admitted for eclampsia She was not in labour Fits were controlled within 6 hours after admission She developed accidental haemorrhage 8 hours after admission and also clotting defect. Lower segment caesarean section was performed and Couvelaire uterus was noted Patient had 3 units of blood and 2 bottles of reconstituted double strength plasma. Patient died of hypo-fibrinogenaemia

Case 3 Z B was admitted with anuria and was not in labour Lower segment caesarean section was done Patient died of renal failure on the 8th post operative day Patient had received 2 units of blood and modified Bull s regime

Case 4 A B was not in labour on ad mission A.R.M was performed and pitocin drip was started Patient was getting uterine contractions Her condition sud denly deteriorated and she died of what was presumed to be amniotic fluid embolism.

Case 5 K. B was admitted in a state of shock. She was not in labour She died 7 hours after admiss on due to clotting defect. She had one unit of recon stituted plasma Blood was not available

Case 6 N R. was admitted moderately shocked delivered within 6 hours after admiss on She died 48 hours later of what was suspected to be cerebral throm bosis.

Case 7 B B was admitted in the 2nd stage of labour in a state of severe shock with vaginal bleeding due to clotting de fect. She died undelivered as no blood was available Plasma infusion was started

Comments

Thus the overall incidence of 0 56 per cent shows that a little over 1 in 200 expectant mothers are likely to develop accidental haemorrhage Toxaemia in the form of hypertension and/or oedema was noted in 62 per cent of cases, and it is easily the major causative factor

In the non-toxaemic group, con sisting of 38 per cent of cases, the associated condition could not be clearly defined In this latter group the incidence of multiparity, presence of severe anaemia and malnutrition were outstanding Two pairs of twins, 2 cases of diabetes mellitus, one case of previous caesarean section were met with Circumvallate placenta, which might have had a possible aetiological relationship, as claimed by Sexton, was noted in only one case Grade 'O' might have included the cases of so-called ruptured marginal sinus This was suspected only in 2 of the placentae that were examined, although Bartholomew *et al* recorded a larger frequency

One would be inclined to agree with Browne and Douglas that, in cases of Couvelaire uterus, the patient must have passed through a phase of hypo-fibrinogenaemia enabling the blood to penetrate through the uterine masculature Severe shock and renal failure are now well established as closely related phenomena

Artificial rupture of membranes, in every case of accidental haemorrhage, was the main stay of treatment It helps to reduce shock, to restore renal secretion, to stimulate uterine contractions and to prevent further absorption of thrombo-plastins Blood volume is corrected and perhaps renal failure is averted by early transfusion The lowered fibrinogen content could be effective-

TABLE XII

Case No	Age/ Parity	Term of pregnancy	Grade	Degree of shock	Associated complications	Whether in labour or not	Duration of labour	Management	Cause of death
1	35/VI	F T	II	moderate shock	nil	yes	less than 6 hours	Spontaneous	severe P.P.H hypo-fibrino-genaemia
2	23/V	30 weeks	III	nil	admitted for ec-lampsia	no	not in labour	lower segment caesarean section (Couvelaire uterus)	shock and hypo-fibrino-genaemia
3	16/II	F T	III	severely shocked	anuria	no	not in labour	lower segment caesarean section	8th postoperative day of anuria
4	30/VI	30 weeks	III	moderate shock	nil	no	not in labour	A.R.M and pitocin drip undelivered	amniotic fluid embolism
5	30/VI	F T	III	severe shock	afibrino-genaemia	no	not in labour	undelivered	shock
6	30/VIII	F T	III	moderate shock	patient had fits 48 hours after delivery	no	less than 6 hours	A.R.M and pitocin drip	cerebral thrombosis
7	30/VI	F T	III	severe shock	afibrino-genaemia	yes	admitted in second stage of labour	undelivered	shock

Haemorrhage" Oxford Blackwell Scientific Publications, 1952

12 Sophian J Jour of Obst. & Gyn *B E 62, 37, 1955*

13 Trueta J *et al* "Studies of Renal Circulation" Blackwell, Oxford, 1947

14 Weiner A. E., Reid D E., and Roby C C Amer J Obst and Gyn, 60, 514 1950

15 Weiner A. E, Reid D E and Roby C C.. Amer J Obst and Gyn 66, 475 1953

ly raised by giving double strength reconstituted plasma This done, there is not likely to be any post-partum haemorrhage

Mild cases and those admitted with good foetal heart sounds need careful evaluation if perinatal mortality is to be minimised Prompt decision to induce labour in cases of antepartum haemorrhage, howsoever mild, especially when associated with toxaemia, would contribute towards this end

Conclusion

In view of the high maternal and foetal loss, ways and means to minimise these should be adopted The following deserve consideration

1 Adequate antenatal care
2 Accidental haemorrhage should be suspected and looked for in all cases complaining of vaginal bleeding and/or abdominal pain, however mild
3 When diagnosed early and treated promptly these patients have better foetal and maternal results
4 Awareness of the grave outcome of these conditions by the members of the hospital staff, medical officers and nursing staff, would certainly minimise this serious sequela of toxaemia to a great extent

Summary

One hundred and sixty-one cases of accidental haemorrhage were studied Incidence of accidental haemorrhage noted as 0 56 per cent Toxaemia of pregnancy was associated in 62 per cent of cases of accidental haemorrhage

Blood transfusion was given to 39 cases

Double strength plasma infusion was given in 12 cases

A R M with or without pitocin drip was the usual method of hastening labour

Caesarean section was done in 18 cases in the 3 year period and in one case caesarean hysterectomy

Maternal mortality was 4 4 per cent in the 161 cases The perinatal loss was 56 6 per cent

References

1 Barry A P *et al* Brit Med Jour, ii, 12, 1955
2 Bartholomew R A *et al* Amer Jour of Obst and Gyn, 57, 69, 1949
3 Browne O D Brit Jour of Obst & Gyn, 59, 153, 1952
4 Douglas Gordon R, Buchman M I, Macdonald F A Brit Jour of Obst & Gyn, 61, 710, 1955
5 Munro Kerr J M *et al* "Historical Review of British Obstetrics and Gynaecology", Livingston, Edinburgh and London, 1954
6 Page E W, King E B and Merril J A Obst & Gyn, 3, 385, 1954
7 Porter T Jr Obst and Gyn, 15, 690, 1960
8 Schneider C L Amer J Obst & Gyn, 64, 14, 1958
9 Schneider C L Amer J Obst & Gyn, 65, 245, 1953
10 Sexton L I *et al* Amer J Obst & Gyn, 59, 13, 1950
11 Sheehan H L and More H. C "Renal Cortical Necrosis and the Kidney in Concealed Accidental

be nearly equally divided in all the different parities

TABLE III

Parity Distribution

Parity	No of cases
I	22
II	21
III	13
IV	34
V	21
VI	27
VII	24
VIII & more	28
Total	190

Table IV compares the parity distribution in this series with the parity distribution of the hospital patients at large It can be seen that the incidence of accidental haemorrhage is least amongst primiparae and that it rises as parity increases, markedly so after parity V

TABLE IV

Parity Distribution compared to Hospital Patients

Parity	Acci haem	Hospital patients (based on 5 000 confinements)
I	11 6 %	21.1 %
II to V	46.8 %	62.9 %
VI & above	41.6 %	16 0 %

Gestational Age

Table V gives period of gestation at the time of the occurrence of accidental haemorrhage in the present series The greatest number of cases is between 39-40 weeks Waddington's experience is also similar

Antenatal care

Out of the 190 cases, 111, 58 4 %, were emergency cases who received no antenatal care and 79, 41 6 %, were booked cases The preponderance of emergency cases needs no comment However, it must be emphasized that 40 out of the 79 booked cases paid merely one or two visits for the antenatal check-up, most of these before the last month of pregnancy In short, half of the booked cases did not properly avail themselves of the antenatal care offered and frustrated the whole purpose of registering themselves at the hospital for confinement

TABLE V

Period of Gestation

Period of gestation in weeks	No of cases
28 - 30	35
31 - 32	14
33 - 34	10
35 - 36	26
37 - 38	18
39 - 40	87
Total	190

Toxaemia of Pregnancy

Presence of any two of the three cardinal signs, viz high blood pressure (systolic above 130 mm Hg or diastolic above 90 mm Hg), oedema and albuminuria, was taken as diagnostic of a toxaemic pregnancy Out of the 190 cases, 60 were toxaemic This gives an incidence of toxaemia of 31 6 %, an incidence far greater than that observed in the hospital patients in general Hester and Salley report 45% incidence of toxaemia in their series of accidental haemorrhage Waddington reports a 16 5 % incidence of toxaemia in accidental haemorrhage, which is three times the incidence of 5 5 % toxaemia at his hospital. The role of toxaemia of pregnancy in the etiology

ACCIDENTAL HAEMORRHAGE *

by

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Accidental haemorrhage, or abruptio placentae, signifies a premature separation, i e before the onset of the third stage of labour, of normally situated placenta, whatever be the cause of such separation Once the condition sets up, it is usually progressive, more and more area of the placenta getting separated as time passes on By its very nature the condition is extremely hazardous to the existence of the foetus in utero, depriving it of its very source of life But even the great foetal hazards do not minimize the dangers to the mother that lie in shock, hypofibrinogenaemia and renal failure The seriousness of the condition and its progressive nature demand a great alertness on the part of the obstetrician in treating it promptly

Incidence

From 1st Jan 1959 to 31st Aug 1960 there were 17213 confinements at the Nowrosjee Wadia Maternity Hospital During this period there were 190 cases of accidental haemorrhage This gives an incidence of 1 90 confinements Table I gives the incidence reported by other writers The incidence will vary from place to place depending on the effective antenatal care received by the patients and the incidence of toxaemia of pregnancy

TABLE I
Incidence

Author	Incidence
Hester & Salley	1 74
Waddington	1 104
Porter	1 192
Dyer & McCaughey	1 180
Present Series	1 90

Age

Table II gives the age distribution in our series Greatest number of cases lie in the age group 26-30 years, this being the period of maximum fertility Dyer and McCaughey report the greatest number of cases in the age group 21-30 years

TABLE II
Age Distribution

Age in years	No of cases
16-20	20
21-25	47
26-30	71
31-35	44
36-40	8
Total	190

Parity

Table III gives the parity distribution in our series The cases seem to

*Paper read at the 11th All-India Obstetric and Gynaecological Congress at Calcutta in January 1961

1050 c c or more of blood 3850 c c was the maximum amount of blood given to a single patient

After the diagnosis of accidental haemorrhage was arrived at, the patients were kept under a careful watch while spontaneous labour was awaited If the bleeding, either revealed or concealed, persisted, an artificial rupture of membranes was promptly resorted to This was necessary in 87 cases and in 66 of these no further treatment was required Rupture of membranes, spontaneous or artificial, hastens the delivery and helps quicker emptying of the uterus, which is the essence of the management of accidental haemorrhage Rupture of membranes also decreases the intra-uterine pressure and hence minimises the danger of hypofibrinogenaemia from thromboplastin absorption If after rupture of membranes the progress of the condition is arrested or if the uterine contractions are poor we resort to oxytocics in the form of an intravenous pitocin drip administration In this series pitocin drip was required in only 21 cases In cases of accidental haemorrage pitocin drip should not be given before the rupture of membranes for fear of hypo-fibrinogenaemia resulting from the increased intra-uterine pressure We have repeatedly noted that in cases of accidental haemorrhage the uterus does not respond to the administration of normal amounts of pitocin According to our present practice, the pitocin drip given to cases of accidental haemorrhage contains 0 03 to 0 04 units of pitocin per c c instead of the usual amount of 0 01 units In certain cases this concentration is required to be further increased before the uterus responds to it and pains start We have safely given pitocin drips with concentrations of 0 06 units per c c to cases of accidental haemorrhage during labour It is difficult to explain the lack of response of the uterus to normal amounts of pitocin in cases of accidental haemorrhage Possibly, the premature separation of placenta and the resulting retroplacental clot lead to the release of pitocinase, the absorption of which results in the rapid destruction of circulating pitocin, both natural and administered and hence the uterine inertia and the lack of response to administered pitocin.

The main aim in the management of accidental haemorrhage is to effect an emptying of the uterus which alone is a guarantee against further separation of the placenta When active treatment was necessary to effect a quick evacuation of the uterus we found that artificial rupture of membranes with pitocin drip if required, was very effective even when the cervix was not favourable or ripe, and even in primiparae

We use caesarean section very rarely in cases of accidental haemorrhage Foetal chances are very poor and hence we usually compromise the foetal chances in favour of vaginal delivery We use caesarean section only for maternal indication If the patient's condition warrants immediate evacuation of the uterus or if the uterus does not respond to oxytocics while the patient's condition is worsening, then only we resort to caesarean section In this series caesarean section was required on only 4 occasions

of accidental haemorrhage seems unquestionable

Etiology

The role of parity, antenatal care and toxaemia of pregnancy is already referred to It seems that proper antenatal care will reduce the incidence of toxaemia of pregnancy and the occurrence of accidental haemorrhage However, it must be emphasized that in 130 or 68 4 % of our cases there was no toxaemia In 5 of these trauma was an etiological factor In all of these 5 cases, direct trauma to the abdomen in the form of a kick, blow or fall immediately proceeded the onset of accidental haemorrhage in an otherwise normal pregnancy In 4 other cases a short cord was thought to be responsible for the accidental haemorrhage In all these 4 cases accidental haemorrhage set in during the second stage of labour In 2 cases of hydraminos, sudden spontaneous rupture of membranes was soon followed by the onset of accidental haemorrhage In our series of 190 cases, in 119 cases no etiological factor could be detected Much work needs to be done as far as the etiology of accidental haemorrhage is concerned

TABLE VI
Etiology

Etiological factor	No of cases
Toxaemia	60
Trauma	5
Short Cord	4
Hydramnios & sudden rupture of membranes	2
Unknown	119
Total	190

Clinical Diagnosis

The diagnosis of revealed accidental haemorrhage is usually arrived at by the exclusion of other causes of antepartum haemorrhage In general, the presence of toxaemia of pregnancy favours the diagnosis of accidental haemorrhage

The diagnosis of concealed accidental haemorrhage is based on the gradual development of a well known clinical syndrome of tense and tender uterus, inability to palpate the foetal parts and the disappearance of foetal heart sounds Table VII gives the clinical features seen in the present series We came across 40 cases of pure concealed accidental haemorrhage without any revealed bleeding

TABLE VII
Clinical Features

Clinical features	No of cases
Vaginal bleeding	150
Toxaemia	60
Tense uterus	56
Tender uterus	25
Inability to palpate foetal parts	26
F.H.S absent on admission	101
F.H.S disappearance after admission	43

Management

The management of accidental haemorrhage at our hospital is essentially conservative, an abdominal delivery being rarely resorted to The preliminary management consists in the efficient treatment of shock Blood transfusions are freely administered as necessary In the present series, 53 cases, 28%, required blood transfusions Out of those 53 cases, 23 needed 350 c c of blood, 19 needed 700 c c of blood and only 11 needed

TABLE VIII
Treatment

Treatment	No of cases
Nil active	99
A R M.	66
A R M + I V pitocin drip	21
L S C S	4
Total	190

Complications

In the present series 12 patients had post-partum haemorrhage, one of whom expired Clinical picture of hypo-fibrinogenaemia developed in 4 cases in the present series In all of them the hypo-fibrinogenaemia was successfully combated by giving triple or quadruple plasma

Maternal Mortality

There were 4 maternal deaths in the series The maternal mortality rate, thus, is 2 1% One patient had severe uncontrollable post-partum haemorrhage and died 4 hours after delivery as a result of it One patient died of cardiac failure due to severe anaemia on the 7th day after delivery Two patients died undelivered, one of whom could probably have been saved by a timely caesarean section

Foetal Salvage

In the present series there were 144 stillbirths and 13 neonatal deaths and thus the perinatal mortality is 82 6% There were 46 live-births among the 190 babies, a gross live-birth rate of 24 2% But in 101 cases the foetal heart sounds were absent on admission Out of the 89 cases in whom the foetal heart sounds were present on admission, there were 46 or 51 7% live-births Among the 60 toxaemic cases there were 11 or 18 3% live-births whereas among the 130 non-toxaemic cases there were 35 or 27% live-births 142 babies weighed less than 5 lbs at birth and among them there were 28 or 20% live-births Out of the 48 babies who weighed more than 5 lbs at birth, 18 or 37 5% were live-born The live-birth rate in mild cases was 34 1% (29 live-births among 85 cases) In moderate cases it was 21% (16 live-births out of 76 cases) and in severe cases it was 3 4% (1 live-birth out of 29 cases) Out of the 46 live-born babies, 13 expired in the first week after birth Only 2 of these 13 had a birth weight of more than 5 lbs The foetal salvage is a complex problem involving the role of prematurity, toxaemia of pregnancy and severity of accidental haemorrage, all of which weigh heavily against the foetus

Comments

Accidental haemorrhage is one of the most serious complications met with in obstetrics and demands prompt management We advocate conservative management and only rarely resort to abdominal delivery We feel that artificial rupture of membranes and pitocin drip are adequate weapons in the management of most of the cases Maternal mortality rate in the present series is 2 1% and in only 1 out of the 4 cases the mother's life could probably have been saved by a timely caesarean section The perinatal mortality of 82 6% in the present series may sound very high But as has been pointed out when the foetal heart sounds were present on admission 51 7% of the babies were live-born Apart from anything else,

OBSERVATIONS ON ACCIDENTAL HAEMORRHAGE BASED ON 64 CASES *

by

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At the Nilratan Sircar Medical College during the period 1-10-58 to 1-8-60, there were admitted 64 cases of Abruptio Placentae During the same period total number of confinements was 10,839, so the incidence of accidental haemorrhage was 0 59% (1 in 169)

Aetiology Toxaemia of pregnancy was found in 42 1% cases while trauma was present in 4 7% cases In 7 8% cases twins, hydramnios, short cord were associated Hypertension was found in 5 cases and severe anaemia in pregnancy was found in 6 cases There was 1 case of circumvallate placenta No cause was found in 28% of cases It is noteworthy that in 2 cases accidental haemorrhage developed in anaemia of pregnancy while admitted in the ward, and in 3 cases accidental haemorrhage occurred in preeclampsia while being treated in hospital In one case abruption occurred after being admitted in labour with dribbling liquor amnii

Clinical Features There were 65 6% of cases between the ages of 21 years and 30 years Below 20 years there were 3 cases, between 31 and 40 years 8 cases and above 40 years there was 1 case Primigravidae 10 9% of cases while the rest were multiparae Incidence was found greater with rising parity when considered as to the number of confinements per individual parity Period of gestation was below 36 weeks in 70 3% cases while 26 7% cases were above 36 weeks Pain was present in 41 cases, of which pain preceded bleeding in 32 and followed bleeding in 9 cases Accidental haemorrhage was of severe type in 49 cases and milder variety was found in 15 cases Warning haemorrhage was found in 3 cases Bleeding was concealed in 11% of cases Shock was present in 15 6% of cases These were of the severe variety Hypertension was present in 56 3% and oedema was found in 48 4% of cases Uterus was of normal tone in 28 cases, slightly tense in 6 cases and hard in 30 cases Foetal heart sounds were absent on admission in 26 cases, while in 8 cases they disappeared after admission 44 cases were in labour on admission while 19 cases were not in labour and 1 case was admitted post-partum Albuminuria was present in 26 cases on admission and in 2 cases albumin appeared later in labour In 27 cases haemoglobin was between 4 to 7 gm while in 31 cases it was between 7 to 10 gm Fibrinogen was estimated before confine-

*Paper read at the 11th All-India Obstetric and Gynaecological Congress at Calcutta in January 1961

ACCIDENTAL HAEMORRHAGE — A CLINICAL STUDY *

by

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and

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Premature separation of the normally situated placenta has been regarded as potentially the most dangerous form of obstetrical haemorrhage in the last trimester of pregnancy

This condition was first distinguished from placenta praevia by Rigby in 1779 Goodell, in 1875, called attention to the high mortality in patients suffering from this catastrophe From then onwards many writers have described its association with albuminuria, toxaemia, chronic nephritis, hypertension, etc De Lee, in 1901, postulated a haemophilic-like condition in the blood of patients suffering from such a condition, whereas Wilson, in 1922, mentioned a defect in the coagulation mechanism Dieckmann, in 1936, noted decreased fibrinogen in some cases of accidental haemorrhage, the term now known as hypo-fibrinogenaemia

This is a review of 74 cases of accidental haemorrhage treated in the Department of Obstetrics & Gynaecology of the Lady Hardinge Medical College Hospital, New Delhi, in the last 2 years Investigations, like fibrinogen level and fibrin index, etc , have not been possible due to lack of facilities

From Table I, it is apparent that the clinical classification of ante-partum haemorrhage is not very satisfactory, as in over 68% of the cases the cause of haemorrhage is unknown Placenta praevia is more common, contributing to 18 4% of the cases Kimborough showed, however, in his 14 years' survey that accidental haemorrhage was more than twice as common as placenta praevia in Philadelphia It is possible that the high fertility in our country may be responsible for this change in the incidence In years 1959-1960, the total number of confinements in our hospital were 9,760 giving an incidence of abruptio placentae as 1/132 2 deliveries

TABLE I

Total no of A. P H. cases	Placenta praevia	Accidental haemorrhage	Undelivered	Unclassified
581	107 18 40 %	74 12.56 %	146 25.33 %	254 43 71 %

*Paper read at the 11th All India Obstetric and Gynaecological Congress at Calcutta in January 1961

opinion as to the use of intravenous pitocin in selected cases The argument against it is that it may produce rupture of uterus in damaged uterus and cause thromboplastin embolism and fibrinogen deficiency In selected cases it does help in contraction of uterus and rapid emptying of uterus results

Foetal mortality is very high in accidental haemorrhage since it is a progressive condition as compared to placenta praevia In many cases foetus is already dead due to placental detachment before the patient is admitted In those cases where foetus is in distress, quick caesarean section, if maternal condition allows, would save some babies

Haemorrhagic diathesis due to fibrinogen deficiency and kidney failure due to shock and cortical necrosis are no doubt serious maternal complications and treatment should be guided keeping these in view If prompt treatment of shock and blood loss is instituted early, the incidence of these complications can be avoided

Acknowledgment

I am indebted to Dr P Dutta, House Surgeon, who collected the data and helped with the analysis My thanks are due to the Principal and Superintendent, Dr R N Guha, for permission to use the hospital records

TABLE II

Years	Total no of deliveries	No of patients	Incidence	deliveries Percentage
1959-60	9790	74	1/132.2 deliveries	0 75 %

This incidence is, however, by no means constant and seems to vary from clinic to clinic Kimborough and Jones reported an incidence of 1/250 deliveries over a period of 12 years' study Dyer and McCaughy reported 1/64, Daro and co-workers 1/238 deliveries while Chientienhsu has reported 1/48 confinements This difference in frequency is, perhaps, caused by different criteria used in the diagnosis of abruptio placentae The incidence in the literature ranges between 1/51—1, 300 deliveries This figure rises if only toxaemic patients are also included Our study includes only proved cases of accidental haemorrhage which showed the presence of old or recent retroplacental clot formation The clot was sizable and was attached to the maternal surface of placenta forming a depression at the same area, often showing unequivocal changes in colour of the maternal placental surface Minute retroplacental clots or small organised areas of separated placental tissue were excluded from the series

trauma, version or previous operations on the uterus was found in any of these cases Though no battery of kidney function tests was performed yet none of the cases presented any clinical symptoms suggestive of kidney lesion, if the toxaemic cases were excluded In 136 of his cases Dieckmann found 69% associated with toxaemia of pregnancy Recent work, however, both in this country and abroad, has shown that the incidence of toxaemia is much lower In the present group of patients it was 31%, whereas in Kimborough's series it is only 8 8% Hertig claimed the toxic separation of the placenta is a form of uterine eclampsia since fatal cases showed hepatic lesions indistinguishable from eclampsia Considerable work is being done to explain those cases of accidental haemorrhage in which no cause could be discovered

Hypotension has been cited as a causal factor by various workers like Smith and Fields, Crawford and Murry in causing premature separation of placenta especially where spinal anaesthesia has been administered. Nesbitt and Holmes have described the supine hypotensive syn-

TABLE III
Etiological Factors

Total no of cases	P E T percentage	Hydramnios percentage	Twins percentage	Eclampsia percentage	Idiopathic percentage
74	23 - 31	1 - 1.3	1 - 1.3	1 - 1.3	48 - 64.8

From this table it is clear that no cause or associated condition could be discovered in nearly 64 8% of the cases No history of any external

TABLE XI
Management

Type of delivery	No of cases	Percentage
Vaginal	72	97.3%
C. section	2	2.7%
C. hysterectomy	Nil	0%

From this table it is clear that vaginal delivery has been the method of choice, whereas the method of treatment is the same in all the clinics in the mild cases, in moderate and severe cases there is no uniformity The controversy between caesarean section and vaginal delivery in the latter cases is by no means settled. Caesarean section rate has been reported as 37 8% (Dyer and McChaughey) In our patients it was only 2 7% and there was no case of caesarean hysterectomy The line of treatment adopted has been mainly conservative, i e sedation combined with artificial rupture of membranes Weiner, Reid and Roby have stated that artificial rupture of membranes by reducing intra-cavity pressure often will reduce absorption of thromboplastin and improve the reflex ischemia of the kidneys In cases where labour was sluggish following artificial rupture of membranes, pitocin drip 1/5000 to 1/2500 was given under strictly controlled conditions with very satisfactory results A strict watch on urinary output was kept to assess renal function Antibiotics were freely used Other symptomatic treatments were instituted whenever required

TABLE XII

Weights of placenta	Weights of retro placental clots
Range 8 ozs.—1.2 lbs	3 ozs.—2.2 lbs
Average 14 ozs.	Average 11.8 ozs

The placentas were weighed in all the cases and weights varied from 8 ozs to 1 lb 10 oz Retroplacental clots varied from 3 ozs to 2 lb 2 oz The placentas were studied in most of the cases in an attempt to correlate the placental changes with clinical findings Macroscopic study showed increased number of infarcts in 60% of cases Microscopic sections were studied in 10 cases but no persistence of Langhan s cells was found The study did not reveal immaturity of the placenta as reported by Jeffcoate Circumvallate placenta and marginal sinus rupture were not encountered in the above group

Complications Two patients developed post-partum haemorrage in spite of all precautions but both patients however, recovered after treatment One patient developed anuria in puerperium, she was 30 years old, 6th gravida, admitted with 34 weeks pregnancy severe pain in abdomen and vaginal bleeding 4½ hours prior to admission Blood pressure was 250/130 mm Hg and albumin +++ and marked oedema of the feet was present Blood urea report on second day was 40 8 mgm % and rose later to 150 mgm % Urinary output diminished till it was only 1-3 ozs per day This condition lasted for nearly 72 hours patient was treated with Bull s regime and gradually recovered completely with no residual kidney lesion There were no cases of jaundice, thrombophlebitis pyelitis etc No case of amniotic fluid embolism was observed in cases where pitocin drip was used

Maternal Mortality It was 2 7% Both the patients died in the puerperium First patient H K. 28

patients Albuminuria was the next commonest sign It was also found that the constitutional symptomatology was in direct proportion to the amount of haemorrhage Severe cases commonly occurred before the onset of labour

lower than quoted anywhere in the literature The cause of this discrepancy is not at all clear Even though the number of the cases studied was not many, yet there is a definite lowering of fibrinogen level in cases of accidental haemorrhage as compared

TABLE VIII

Total cases	Mild	Percentage	Moderate	Percentage	Severe	Percentage
74	43	58 1	25	33 8	6	8.1

This table shows the subdivision of the cases into mild moderate and severe varieties Mild cases were those where there were no symptoms or signs other than vaginal bleeding and were generally diagnosed in retrospect after the inspection of the placenta Moderate cases were those where hypertonicity of the uterus was present along with the vaginal bleeding with little or no shock Foetal heart sounds were more often absent in this group In the severe cases the uterus was distended, tense and very tender No foetal parts could be made out and there was associated moderate to severe degree of shock Foetal heart sounds were absent in practically 100% of the cases

Clot retraction test was done in 14 cases In only one case blood did not clot for half an hour no abnormality was discovered in rest of the cases

Bleeding and clotting time was also done in as many cases as possible There was no variation in results from normal except in one Quoted below are the fibrinogen levels as observed in another series of patients at Lady Hardinge Hospital

One striking feature of this table is that all the fibrinogen levels are much

TABLE IX

	Types	Average fibrinogen level
1	Non-pregnant	170.32 mgm %
2	Normal pregnant	245 35 mgm %
3	Accidental haemorrhage	184.92 mgm % (in 12 cases)

to normal pregnant women The severe cases, however, showed a greater fall in the fibrinogen levels Haemoglobin varied from 2 5 gms to 10 gms, but majority of the cases were between 7 and 10 gms In some of the moderate and severe types of cases, the haemoglobin level fell down sufficiently to warrant an early replacement of blood by transfusion In 8 cases besides other treatment blood transfusions from 300-1000 c c were given

TABLE X

Income Group

No of cases	Below Rs 100	Between Rs 100-300	Above Rs 300
74	23	50	1

This table shows that majority of the patients belong to low income group where the maternal nutrition is poor and the patients are anaemic even before the onset of pregnancy

10 Holmes J Obst. & Gyn B E 64, 229, 1957

11 Jeffcoate J Obst & Gyn B.E

12 Kimborough Am J Obst. & Gyn 78, 1167, 1959

13 Kimborough & Johnes Am J Obst. & Gyn , 55 496, 1948

14 Nesbit J Obst & Gyn 12 359 1958

15 Riby & Goodell. Am J Obst & Gyn , 59, 13, 1950

16 Smith and Fields Obst & Gyn 12, 369, 1958

17 Weiner Reid and Roby 66, 475 1953

TABLE XIII

Total no of cases	Maternal deaths	%	Foetal loss	%	Alive	%
74	2	2 7	50	67.56	24	22.29

years old, was admitted with 32 weeks' pregnancy with antepartum haemorrhage on 16-1-60 at 3-25 p m Uterus was very tense and no foetal parts or foetal heart could be detected Haemoglobin was 6 gms % and albuminuria was present but blood pressure was within normal levels Patient was given a blood transfusion and delivered normally after artificial rupture of membranes Five hours after delivery patient suddenly became dyspnoeic, breathing became laboured, she looked very pale and expired before anything could be done Postmortem was refused Possible cause of death could be pulmonary embolism Second patient, D K, 36 years old, 8th gravida, was admitted on 21-1-60 with 36 weeks' pregnancy and history of antepartum haemorrhage She had severe pre-eclamptic toxaemia and was diagnosed as a case of accidental haemorrhage Artificial rupture of membranes was done and patient delivered a still-born foetus within 12 hours of rupture of membranes Soon after delivery, she had an eclamptic fit which was controlled with sedatives She developed oliguria after delivery which progressed to anuria Blood urea rose to 220 mgm %, blood potassium also showed a rise and electrocardiographic changes were noticed In spite of all the treatment patient died on 8-2-60 Postmortem renal biopsy showed hyalinised glomeruli with some dilatation of the tubules on the right side Pyelonephritis was reported on the left kidney biopsy It is quite possible that the patient had a pre-existing kidney lesion which deteriorated as pregnancy advanced Super-imposed toxaemia and finally premature separation of placenta resulted in kidney failure

Our maternal mortality of 2 7% compares favourably with that of some workers—Hester & Selly 4%, Chientienhsu 15 6%, Hendleman and Fraser, however, had *no maternal* mortality at all Their perinatal mortality is only 39 5% whereas our foetal loss is about 68% There is thus a great scope for improvement in our results

References

1. Chientienhsu Am J Obst & Gyn, 80, 263, 1960
2. Crawford & Murray Obst & Gyn, 15, 97, 1960
3. Daro & co-workers Am J Obst Gyn, 72, 599, 1956
4. Deickman Am J Obst & Gyn, 31, 734, 1936
5. DeLee Am J Obst & Gym, 44. 785, 1901
6. Dyer and McCoughey Am J Obst & Gyn, 77, 1178, 1959
7. Hendleman & Frazer Am J Obst & Gyn, 80, 17, 1960
8. Hertig, quoted by Greenhill, Principles and Practice of Obst 10 ed Philadelphia & London, W B Saunders & Co, page 410-419
9. Hester and Sally Am J Obst & Gyn 44, 218, 1957

The impression was pulmonary hypertension In view of the history of breath lessness and palpitation since childhood and absence of rheumatic history it was presumed that the pulmonary hypertension was probably due to (a) atrial septal defect (commonest form of congenital cardiac lesion) (b) ventricular septal defect, or (c) primary pulmonary hypertension though rare not uncommon.

Treatment Given

1 Patient was digitalized and congestive failure was alleviated
2 Priscolin, a vasodilator drug was also tried.
3 Patient was advised absolute rest

Investigations

Haemoglobin, 11 5 G%

Urine—No albumin or sugar or caste W.B C—8 100 per/c mm Differential count poly 63% eosinophils 6% monocytes 28% Nucleated red cells 3%—blood group 'B Stool—No ova or cysts Weight of the patient —85 lbs

Progress The patient had a slight rise of temperature at the time of admission which touched normal the next day and remained normal until death Her pulse varied between 90 and 100 Blood pressure was 120/80 Her general condition improved with rest and the above treatment. She was seen frequently by the cardiologist. Everything seemed to be going on smoothly but on 17-7 1960 about 3 months after admission the patient noticed slight vaginal bleeding at 6 p m. She was transferred to the labour ward The height of the uterus was 30 weeks and the foetal heart could be heard

10 P.M The patient started to bleed profusely Pethidine 100 mgm was given Blood transfusion of packed cells was started Uterine contractions were present occurring every 10 minutes and lasting for half a minute Foetal heart rate was 160

Vaginal Examination Cervix admitted 3 fingers. Presenting part was high No placental tissue was felt A diagnosis of accidental haemorrhage was made Membranes were ruptured artificially and an abdominal binder was applied

11 P M Bleeding continued It was decided to give pitocin drip to hasten labour 2½ units of pitocin in 500 cc glucose was started. Pulse 120 Bleeding continued and foetal heart was not audible Patient delivered a still born foetus weight 1 lb 6 oz. *soon after* mid night This was followed *immediately* by expulsion of the placenta and *huge* retro placental clots The *patient had slight* post-partum haemorrhage also *This* was controlled by ergometrine, 0.25 mgm intravenously Blood pressure 100/70—pulse 130 Four hours after delivery patient was returned to the ward. Her pulse was 120

18 7 60 (The next day) Patient vomited once She complained of epigastric pain Pulse—120 pethidine 50 mgm was given Penicillin was given prophylactically

2nd day Patient awoke after a good night's sleep There was no breathlessness nausea or vomiting Blood pressure—100/75 pulse—112 Lungs were clear In the evening she complained of precordial and epigastric pain Pethidine 50 mgm was given.

3rd day (6 A M) Patient vomited and became cyanosed Oxygen was started pethidine 50 mgm, was given Pulse 110

3 p.m Vomited again She became dyspnoeic Cyanosis increased oxygen was continued The condition gradually deteriorated and the patient died at 9 45 p m that is less than 72 hours after delivery Permission for post mortem was not given

Discussion

Through all the ages physicians have feared, to a greater or lesser extent, the combination of heart disease in pregnancy The general feeling is one of pessimism It carries a serious risk to the mother The commonest types of lesions are rheumatic heart disease and hypertensive heart disease Very little attention has been paid to congenital heart disease in pregnancy

Pouliot, in 1905, stated that marriage should be forbidden in cyanotic

ACCIDENTAL HAEMORRHAGE ASSOCIATED WITH PULMONARY HYPERTENSION *

by

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Accidental haemorrhage in heart disease is extremely rare Many of the standard text-books in Obstetrics do not even make a reference to such an association Johnstone, in his text book on Midwifery, casually mentions that accidental haemorrhage may sometimes be associated with some general diseases of the mother, such as heart disease or syphilis

This case is reported because of the association of accidental haemorrhage with an unusual form of heart failure, right heart failure following pulmonary hypertension The combination of these two conditions resulted in the unexpected death of the patient

Case Report D aged 19 years, gravida I, (Hospital No 24308) was admitted in C M C H , Vellore on 21-4-'60 with the following complaints

2 Amenorrhoea — 5 months

2 Difficulty in breathing from childhood which used to increase on mild exertion such as walking or climbing

Previous History She has had an attack of tonsilitis at the age of 9 years No history of rheumatic fever

Family History The patient was the eldest of three children Two younger brothers are alive and well

On Examination at the Time of Admission The patient was a thin woman of 19 years She was not anaemic but had slight oedema of feet The patient appeared extremely ill and breathless Orthopnoea was present There was no cyanosis or jaundice Lungs — a few crepitations were present over the bases In consultation with the Cardiologist, the following signs were elicited from the cardio-vascular system —

The patient was very orthopnoeic with distended neck veins and slight oedema of feet The individual venous waves could not be analysed There was pre-cordial bulge with grade II left para-sternal lift The apical impulse was of the right ventricular type and was felt in the 5th left intercostal space within the mid-clavicular line There were no thrills either at the apex or over the base of the heart The pulmonary 2nd sound, in other words a diastolic shock, was distinctly palpable over the pulmonary area

On auscultation, the heart sounds were audible and the pulmonary 2nd sound was loud split and accentuated No murmurs were heard

Pulse 90 p m poor in volume, tension B P 100/80 mm Hg

E C G —Showed severe right ventricular hypertrophy pattern

On Fluroscopy There was moderate enlargement of the heart, particularly of the right ventricle, and the main pulmonary artery segment Hilar clouding was present The pulmonary arteries were large and the periphery of the lungs appeared oligaemic, thus giving a coppicing effect

X-ray P A & R A O confirmed the fluroscopic findings of pulmonary hypertension due probably to congenital defect or acquired heart disease Cardiac catheterization could not be done because of orthopnoeic condition

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*Paper read at the 11th All-India Obstetric and Gynaecological Congress Calcutta, in January 1961

possible, termination of pregnancy depends on the period of gestation and the condition of the patient

Causes of Death in Heart Diseases in Pregnancy

We are all familiar with the common causes of death such as heart failure, pulmonary embolism, pulmonary oedema, pneumonia, and sub-acute bacterial endo-carditis, but we have not realised sufficiently the importance of accidental haemorrhage This case is a reminder to us that in heart diseases, an accidental haemorrhage, un-associated with toxaemia, can occur suddenly and unexpectedly as a 'bolt from the blue' and take us unawares and snatch the patient from us

Summary and conclusion

1 A case of accidental haemorrhage in pulmonary hypertension is reported

2 Its etiology, diagnosis and prognosis are briefly discussed

3 Pulmonary hypertension whether primary or secondary has a serious prognosis

4 The great advances made in cardiac surgery in recent years have made the outlook of cardiac disease in pregnancy more optimistic

References

1 Jorge Espino Velo & Dirson Castro Abreu Amer Heart Jour 51 542, 1956
2 Keith Heart Disease in children
3 Nadas Paediatric Cardiology
4 Pardee H. E. B Amer Jour of Obst & Gyn, 17, 255, 1929
5 Paul Wood Diseases of the Heart and Circulation 2nd Ed, Eyre and Spottiswoode
6 Vander Veer Joseph and Kuo P T Amer Heart J 39 2 1950

patients Hoch-singer believed that cyanosis was a good reason to terminate pregnancy Even as late as 1945, Semisch held a view that pregnancy should not be continued in cyanotic congenital cases, while in 1933, Breed and White maintained that 'If a patient with congenital heart disease has reached the age for pregnancy, without intolerance to lead a normal life, she can go through pregnancy and deliver successfully and uneventfully' Shapio and Simons in 1934 were even more optimistic and said that cyanosis in congenital heart disease is not per se contradiction to pregnancy

Pardee in 1941 gave an outline about the management of congenital heart disease in pregnancy He was optimistic In 1950 Van der Veer and Kuo concluded that the prognosis in these cases is good unless it is associated with cyanosis, polycythemia and heart failure

With the advent of cardiac surgery the outlook is completely changed In suitable cases, surgery on the heart can be done even during pregnancy, provided the patient is seen before the 20th week In our hospital, we have had 7 cases where surgery was done during pregnancy and pregnancy continued up to term

In cyanotic congenital heart diseases too, surgery can be done and the results are encouraging We had one case of Fallot's Tetrad, who was relieved by an anastomosis between the left subclavian and pulmonary artery Eighteen months later, she conceived and had a full-term normal delivery We feel confident that with open heart surgery, the outlook for congenital heart disease will improve

Pulmonary hypertension can be either primary or secondary Primary is extremely rare According to Paul Wood, among 100 cases of chronic pulmonary heart disease, only 3 were idiopathic It may occur in either sex

Pulmonary hypertension is the dreaded complication of lesions like an atrial or ventricular septal defect with a large left to right shunt

Pulmonary hypertension imposes a mechanical burden on the right ventricle The ventricle hypertrophies and sooner or later, it fails Fibrillation may develop later on Cyanosis appears, and cardiac output becomes less The arterial oxygen saturation depends on the shunt reversal

Diagnosis Pulmonary hypertension is not diagnosed until far advanced It presents a picture of right ventricular failure In the later stages, it is well nigh impossible to differentiate between various causes like mitral valvular disease, congenital cardiac defects and congenital primary pulmonary hypertension

Prognosis is very serious in primary pulmonary hypertension It is a progressive lesion and has no known cure There is no surgical treatment The patient usually lives for not more than 2 years after its recognition

The prognosis in secondary pulmonary hypertension however varies with its aetiology

Question of Termination of Pregnancy

The extra burden on the left ventricle due to pregnancy would tend to make the patient's condition worse In all those lesions, where cardiac surgery is contra-indicated or not

TABLE 1

	Author	Incidence of ectopic gestation	Incidence of advanced ectopic gestation among all ectopic gestations
1	Schumann (1918)	1 in 303	
2.	King (1954)	1 in 215	
3	Eastman (1956)	1 in 200 (white women) 1 in 120 (non-white women)	
4	S N Upadhay (1955)	1 in 296	
5	Poddar (1957)	1 in 167	4.1 per cent
6	K. G Hospital, Visakhapatnam (1940-1958)	1 in 150	7.5 per cent (over 16 weeks)
7	Clarke & Bourke (1959)		11 7 per cent (over 12 weeks)
8	Beacham	1 in 126	1 in 2081 pregnancies (Secondary abdominal pregnancy)

TABLE 2

A. Early cases 185

Type	Side Rt.	Side Lt.	No
Tubal abortion	61	59	120
Tubal rupture			
Isthmial	4	6	10
Other sites	24	15	39
Broad ligament haematoma	1	5	6
Tubo-ovarian	3	1	4
Ovarian	0	1	1
Tubal rupture with twin embryo	0	1	1
Interstitial (12 weeks to 14 weeks)	1	3	4
Total	94	91	185

B Advanced cases 15

Type	No	Duration
Interstitial left tube	1	16 weeks
Angular left	1	24 "
Cornual right	2 (1)	40 "
	(2)	24 "
Ovarian left		24 "
Intraligamentary left	2	24 "
Secondary abdominal	7	Term 3
(From primary tubal)		
Right 4		2 at 26 weeks
Left 3		1 at 24 weeks
		1 at 28 weeks
* (Primary uterine)	1	36 weeks
Tubal left	1	40 weeks

* From Victoria Hospital

TABLE 3

Site	No	Incidence among all advanced ectopics	Incidence among all ectopics
Secondary abdominal	7	46.6 %	3.5 %
Cornual	2	13.3 %	1.0 %
Intraligamentary	2	13.3 %	1 0 %
Angular	1	6.6 %	0.5 %
Tubal	1	6 6 %	0.5 %
Ovarian	1	6.6 %	0.5 %
Interstitial	1	6.6 %	0.5 %

ADVANCED ECTOPIC GESTATION

(A Study of Twelve Cases)

by

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While ectopic gestation is not an uncommon clinical problem, advanced ectopic gestation is still sufficiently rare to evoke great interest and to raise problems of diagnosis and management The pathological anatomy of ectopic gestation is such that termination is the rule before twelve weeks' or full development of the placenta "the foetus digging its grave while making its bed" Under exceptional circumstances, where the placental attachment escapes total disruption and the condition passes undiagnosed, advancement of the gestation is possible As individual experiences of such cases are few and far between, it is considered profitable to present this study of twelve personally studied cases in a series of fifteen cases that occurred in this Institution from April 1943 to 1960 One case of secondary abdominal pregnancy that occurred at the Victoria Hospital for Women and Children affiliated to the institution is also included, as this patient had part of her antenatal care in our hospital, making a total of 16 cases

Yahai (1956) considered ectopic pregnancy advanced if over 20 weeks, King (1954) if viability is reached and Clarke and Bourke (1959) if 12 weeks old In fact, all ectopics should be considered advanced after placental development is completed In this series the duration ranges from 16 weeks to term though the majority are over 24 weeks and five were at or near term

During these 20 years, there were 200 proved ectopic gestations, with an incidence of 1 in 150 compared to uterine pregnancies Of all ectopic gestations 7 5 per cent were advanced and 2 per cent went to term Mall gives a 1 per cent incidence of term ectopics The general incidence of ectopic gestation is 1 in 300 of all pregnancies Table 1 shows our incidence compared to other authors

The incidence of ectopic gestation in general as well as that of advanced ectopic gestation is higher in our series than the average This is perhaps due to a higher incidence of pelvic infections, paucity of medical care in this part of the world and the tendency for more abnormal than normal labour cases to be brought to hospital

These 200 cases were of the types shown in Table 2

Table 3 shows the relative incidence of advanced ectopic gestation

TABLE 7

	Name	Age	Gravida	Parity	Symptoms	Clinical features	Radiological findings	Biological tests	Preoperative diagnosis	Operation	Remarks, results
	V.I (1958)	20	1	0	6 months amenorrhoea. Pain in the abdomen Tumour in the abdomen. Blood and mucus in stools since 15 days	Aortic stenosis and regurgitation. Irregular abdominal tumour up to umbilicus. Breast changes were present. Uterus anteverted, separate from mass. Mass protruding into the rectum No foetal heart sounds	Skiagram - Foetal skeleton seen. Hysterogram confirmed empty uterus and extra-uterine foetus. Figs. 1 2.	Negative	Secondary abdominal pregnancy	28 weeks size Foetus macerated. Free in the peritoneal cavity Placenta was adherent to bowel and omentum Foetus and placenta removed. No bleeding	Small bowel injured du[illegible] separation of [illegible]hesions. The [illegible] was repa[illegible] Mother alive
2.	M.V (1959) Last child 3 years ago	30	IV	3	9 months amenorrhoea. Pain in abdomen 3 days. Distension abdomen. Similar pain in 3rd month when treated as appendicitis	Abdominal distension. Term pregnancy High position of foetal parts. Vertex presenting No foetal heart sounds. Uterus separate and empty	Skiagram - Foetal skeleton—vertex above pelvic brim Hysterogram - Uterus empty and normal in size Figs. 3 4 5	Not done	Secondary abdominal pregnancy	Foetus female 6 lbs. Macerated. Free in peritoneal cavity Placenta adherent to omentum and bowel Foetus and placenta were removed.	Mother alive
3.	G.C. (1960)	25	1	0	Sterility Irregular and scanty periods. 3 years ago had 6 months amenorrhoea and pain in the abdomen Not treated Not aware of any mass in the abdomen	Large irregular solid stony hard tumour extending from pelvic brim to left hypochondrium Uterus normal in size and felt separate from the tumour	Skiagram - Foetal skeleton seen high up Hysterogram showed empty uterus. Figs. 6 7 8	Not done	Secondary abdominal pregnancy lithopoedion	Large "lithokeliphos" term Foetus covered with white calcified sheath like a shroud. Placenta encapsulated and liquefied Adherent to bowel and omentum. Both foetus and placenta removed Clinically lithopoedion	Mother alive

S No	Name	Age	Gravida	Parity	Symptoms	Clinical features	Radiological findings	Biological tests	Preoperative diagnosis	Operation	Remarks, results
4	L.B (1958)	35	4	3	4 months' amenorrhoea Painful mass in the abdomen Purulent vaginal discharge	Poor general condition Mass in the abdomen up to the umbilicus and pointing near umbilicus Tender Small uterus felt separate and pulled up Small "chicken bones" passed per vaginam Purulent discharge from cervix	Skiagram confirmed foetal skeleton 24 weeks' size Hysterogram not done due to purulent discharge Figs. 9 and 10	Not done	Infected secondary abdominal pregnancy Sac opening into uterus and discharging pus and bones	Patient refused operation In all probability an abdominal sinus would have developed to discharge the foetal sac and its contents	Mother alive
5	P.N (1958) Last child 3 years	30	4	3	9 months' amenorrhoea Severe pain in abdomen since 3rd month of pregnancy Mass protruding from vagina	Term pregnancy Breech presentation Prolapse uterus 3rd degree with oedematous ulcerated cervix Foetal parts are easily palpable Foetal heart sounds audible but rapid. Uterus size of only 16 weeks' pregnancy and empty	Skiagram - Foetus in transverse lie and hip up Figs 11 and 12		Secondary abdominal pregnancy with live foetus and prolapse of the uterus due to pressure of sac	Living female foetus 5 lbs 8 oz Free in peritoneal cavity Covered with vernix. Placenta adherent to bowel and omentum Foetus and placenta removed, No bleeding	Mother alive Baby not deformed Died after hours Postmortem examination showed pulmonary atelectasis Since then she has had another uterine pregnancy
6	R.H (1960) Last child 7 years	30	3	2	9 months' amenorrhoea Pain in abdomen since 1 day She had an abdominal operation in 1952 for inversion of uterus after second child-birth Vaginal bleeding present.	She attended the antenatal out-patient department till 16 weeks when an intrauterine pregnancy was diagnosed Later at 34 weeks she returned for antenatal care at Victoria Hospital. Breech presentation diagnosed Foetal heart audible	None done		Abdominal pain and vaginal bleeding and a tense tender abdomen suggested Accidental haemorrhage	Macerated female foetus 4 lbs 13 oz. in a sac made of omentum, bowel and posterior wall of uterus Uterus flat like a flap 6" x 6" Placenta and foetus removed Scar in posterior wall had given way (Scar for Haultain's operation for correction of inversion)	Mother alive

Comment

The pre-operative diagnosis of extra-uterine gestation could be established with clinical and radiological aids in 9 of our 12 cases However, it was not possible to distinguish a cornual pregnancy or a term tubal pregnancy as such and these were also diagnosed as extra-uterine advanced gestation The intraligamentary pregnancy was diagnosed as an ovarian cyst complicating pregnancy, and the angular pregnancy as an ovarian cyst, possibly a dermoid The case of secondary abdominal pregnancy following a uterine scar rupture was clinically mistaken for concealed accidental haemorrhage The importance of a history of unexplained pain, bleeding and distension in the early months of pregnancy, high position of the foetus, abnormal positions and presentations are always suggestive Finding the uterus separate and empty and hysterography are very helpful The pitocin test was not used in any case in this series

Discussion

Secondary Abdominal Pregnancy is the commonest of the advanced ectopic gestations though rare in itself Eastman gives an incidence of 1 in 15000 pregnancies In our series, the incidence is much higher, 1 in 4300 pregnancies The primary site is the tube in the majority of cases, though the ovary and broad ligament and the uterus itself may contribute a few In our series all the seven were from primary tubal pregnancies, 4 on the right side and 3 on the left The last case was from rupture of a uterine scar on the posterior wall after Haultain's operation for puerperal inversion Such a case has not been reported in the literature, caesarean scar, and scars due to criminal abortion or mere thinning of uterus due to chorionic perforation having been reported The affected tubes were strangely enough free of evidence of infection Infection is not necessarily the cause of all ectopics Ectopic decidual reaction might have been responsible for our cases Two of the patients were primigravidae and in them the opposite tube was patent and healthy Five were multiparae with previous normal vaginal deliveries with no period of sterility intervening

A high incidence of foetal deformities, up to 50 per cent, is reported among the foetuses in secondary abdominal pregnancy due to pressure effects, olygohydramnion and inadequate blood supply In our series, the one lithopoedion (Lithokelyphos in fact) was deformed and fixed by calcification All the other foetuses, viable and non-viable, were well developed without any apparent deformity Two were term foetuses 5 lbs 8 ozs and 6 lbs in weight One lived for four hours and postmortem examination revealed no deformities except pulmonary atelectasis Of those born alive, 60 per cent die in the first year, most of them within the first four weeks according to Gordon Ley's observation

There was one case of a lithokelyphos where after retention of the foetus for 3 years, the foetal skeleton was covered by a calcified white sheath as if wrapped by a shroud The woman carried the mass unaware of its presence and came to hospital only for relief of sterility In one of

S No	Name	Age	Gravida	Parity	Symptoms	Clinical features	Radiological findings	Biological tests	Preoperative diagnosis	Operation	Remarks results
10	K.S (1959)	30	1	0	Profuse bleeding per vaginam since 2 months Tender mass in the abdomen, since 2 months	A soft cystic and tender swelling in left iliac fossa 6″ x 5″ Uterus felt separate on right side and normal in size Bleeding from cervical canal present	Skiagram did not reveal any foetal parts		Ovarian cyst with torsion possibly dermoid cyst	Uterus asymmetrically enlarged to 24 weeks' size Placenta attached to left cornu and shining through thinned out uterine wall Foetus in the uterus Abdominal hysterotomy and removal of foetus and placenta done to preserve the uterus Left angular pregnancy	Mother a l Foetus alive in a few mi
11	R S (1958)	30	IV	3	Pain in the abdomen Mass in the abdomen Dysuria	Irregular tumour in the abdomen extending to the left iliac fossa, tender—Uterus adherent to mass	Skiagram of specimen Foetal skeleton — 24 weeks Fig 16		Multiple fibromyomata	A large solid nodular mass like foetal parts in situation of left ovary Tube adherent but free of the mass and healthy Left salpingo-oophorectomy done Foetal parts in left ovary Biopsy confirmed ovarian tissue in sac and intact tube Left ovarian pregnancy	Mother alive
	K.D	25	II 1st breech still birth, 3 years ago	1	9 months' amenorrhoea Pain in abdomen since 3 days. No foetal movements since then	Term pregnancy Persistent transverse lie Intra uterine death Vaginal bleeding Medical induction tried but no result Developed infection of sac after hysterography Controlled with achromycin given parenterally	Skiagram showed high transverse lie of foetus Hysterogram confirmed Figs 17, 18 and 19			Full-term left tubal pregnancy in middle one-third — very few adhesions Left salpingectomy done Macerated male foetus 6 lbs in an intact tubal gestation	Since then had another u rine pregnai Breech preser tion

sistent transverse lie gave the clue to the diagnosis of a secondary abdominal pregnancy Hysterosalpingography confirmed the same Heavy infection of the sac which had followed hysterography was controlled with antibiotic therapy Laparotomy revealed the amazing fact that it was an unruptured term pregnancy in the tube Left salpingectomy was done The contra-lateral tube and ovary on the affected side were healthy Since then the patient has had a uterine pregnancy at term, with a breech presentation

Ovarian Pregnancy On the other hand the ovary is said to harbour more advanced pregnancies than the tube, despite the scanty muscular tissue in ovarian structure More than 100 proved ovarian pregnancies have been described in the literature and some of these have progressed to term The incidence of ovarian pregnancy is given as varying from 0 7 to 1 07 per cent (Hertig) of all ectopic gestations In our series there were two cases, one early and one advanced, giving a 1 per cent incidence of proved ovarian pregnancies and 0 5 per cent incidence of advanced ovarian pregnancies

In our case, the pre-operative diagnosis was one of multiple fibromyomata There was an irregular abdominal mass of unknown duration, the last child-birth having occurred 7 years earlier There was no amenorrhoea, but menorrhagia was present with dysuria — the pain radiating to the mass during micturition Laparotomy, however, revealed a solid mass resembling foetal structures situated in the region of the left ovary The tube and utero-ovarian ligament were intact Left salpingo-oophorectomy was done Histopathological examination revealed ovarian tissue in the wall of the sac and a foetus, mummified, was present of 26 weeks' size

Intraligamentary Pregnancy or extraperitoneal pregnancy is fairly common Advanced ectopic gestations likewise have been reported quite frequently Owing to the space available within the leaves of the broad ligament, term pregnancies have also occurred at this site The primary site is in the tube Lichtenstein (quoted by Clark and Bourke) thinks that if the placenta is attached near the mesosalpinx, advancement of the pregnancy is possible The placenta may be implanted over the lateral extra-peritoneal wall of the uterus, bladder, rectum or the space in the broad ligament. Growth of the sac is described as anterior or posterior In our case the growth was anterior and the placenta was implanted over the anterior leaf of the broad ligament, the lateral wall of the uterus and stretched over the foetal sac, like a roof Secondary rupture of such a pregnancy can occur, the foetus then growing into the abdominal cavity or perishing at the time of rupture

In our case, the woman had four months' amenorrhoea and acute abdominal pain with extreme pallor There was no external bleeding A mistaken diagnosis of pregnancy complicated by a twisted ovarian cyst was made At laparotomy, there was profuse intra-peritoneal bleeding from a perforation in the upper part of the sac Placental tissue was protruding through the perforation After opening the sac, a live foetus, 24 weeks' size, and placenta were re-

our cases, "chicken bones" were passed through the cervix and the abdominal mass pointed to the umbilicus She refused further treatment but in all probability she would have developed a sinus at the umbilical region to discharge the foetal sac and its contents like Avicenna's classical case

Cornual Pregnancy is rightly included among ectopic gestations Cornual pregnancy is one occurring in a rudimentary horn of a bicornis unicollis type of uterus About a hundred cases have been recorded in the literature Angular and interstitial pregnancies have sometimes been designated as cornual pregnancies A clear distinction is necessary in that cornual pregnancies occur in a rudimentary horn and not in the uterine cavity or in any part of the tube The common fate of these pregnancies is rupture of the horn However, depending on the development of the horn and muscle and space available pregnancies may go to term These, when not diagnosed in time, will end in missed labour or rupture followed by further continuation of the pregnancy in the abdominal cavity or death of the foetus Haemorrhage can be torrential and fatal In 80 per cent of the cases, no communication exists between the rudimentary horn and main horn Hence, external migration of the spermatozoa or the fertilised ovum across the peritoneal cavity from the other tube may be responsible for the pregnancy (Reyner and Wetchier, 1955)

In our two cases, both of uterus bicornus unicollis uni-colpos type, in one, the pregnancy advanced to 24 weeks Abdominal pain and bleeding occurred which were mistaken for a threatened abortion for which she was treated elsewhere, 1½ years later, she came to our hospital with an abdominal mass high in the right iliac fossa and radiological examination as well as clinical examination revealed a foetal shadow, high up and outside the uterus, the contralateral tube being normal The foetus was mummified The horn had no communication with the main horn and was excised and the tube and ovary on this side being healthy, the tube was reimplanted into the main horn of the uterus, thus leaving her with two tubes and ovaries The second case was a term pregnancy in a rudimentary horn which also did not communicate with the main horn The horn with its tube and ovary were excised The opposite tube and ovary were healthy Neither of these patients has since reported to our hospital with pregnancy

Two cases of rupture of rudimentary horn at 4 and 4½ months have been reported by Saley (1955) and Reyner and Wetchier (1955)

Tubal Gestation A full-term tubal gestation is very rare Advanced pregnancy in the tube is itself rare due to the narrow lumen and thin muscular wall of the tube The ampullary portion, however, can lend itself to much distension In our case, the pregnancy was in the mid-portion, the rest of the tube being healthy The pregnancy had advanced to term She was first seen at term, when an intra-uterine pregnancy presenting as a breech and at times a transverse lie was diagnosed There were no foetal heart sounds or movements External version and medical induction were tried but failed A vaginal examination together with the per-

operation, the rupture was silent I occurred sometime after the 16th week of gestation

Situation of Placenta and Its Management This has been the deciding factor in the prognosis and management of all advanced ectopic gestations Moir (1956) affirms that considering the great risks involved in unexpected and uncontrolled haemorrhage, all advanced ectopics should be operated upon as soon as such a condition is suspected or diagnosed, or when met with by surprise at laparotomy The placenta may be adherent to any intraperitoneal viscus, starting from the pelvis Though commonly adherent to the tube, uterus, small bowel and omentum, adhesions to the bladder, rectum liver, etc, have all been reported Haemorrhage is the rule during separation of the placenta as there is no contractile mechanism in any of the organs as in the uterus It was thought that death of the foetus reduces the risk of haemorrhage from placental separation due to thrombosis of the placental vessels This however cannot be relied upon A policy of delaying operation till foetal death is therefore not safe Occasionally and exceptionally one may postpone operation in a case where the foetus is normally developed the gestation is well advanced to near term, and all facilities for immediate laparotomy are available, the patient being under observation in an institution Here the postponement is for the sake of a live foetus Even here the risk taken is too great for the reward obtained, as more than 50 per cent of the foetuses are deformed and among those that are born alive 60 per cent die, either in the neonatal period or before the age of one year Where the placenta cannot be removed along with the foetus, it may be left behind This, however, may give rise to sepsis, secondary haemorrhage, formation of an abdominal mass, intra-abdominal abscesses, sometimes with gas formation and calcification. The placenta takes a long time for absorption, sometimes several years

In our cases, fortunately except in one case of intra-ligamentous pregnancy, removal of the placenta which was adherent in all cases to bowel and omentum was easily accomplished In the case of a lithopoedion retained for 3¼ years, the placenta was partly liquefied and encapsulated

Marsupialisation is abandoned as unnecessary and risky

In one of our cases, the small bowel was injured during separation of adhesions but primary repair was successful.

Diagnosis of Advanced Ectopic Gestation is a matter which calls for extreme alertness on the part of the clinician The literature is replete with reports of cases where the diagnosis was missed Great emphasis is to be placed on a history of abdominal pain, bleeding or signs of intestinal obstruction in early pregnancy Early palpability of the foetal parts, loud foetal heart sounds, a persistently high position of the foetus, persistent abnormal lie and presentation particularly of a transverse lie, or breech presentation are clues to extrauterine location of the foetus Vaginal examination helps if an empty uterus is palpated separately with an uneffaced cervix which may be displaced laterally or downwards as in one of our cases Radiologically a high

moved The bleeding could only be controlled by a rapidly performed hysterectomy and left salpingo-oophorectomy The foetus was not deformed In the early ectopic group there were 5 cases of broad ligament haematoma, no doubt due to early rupture of the ovum into the broad ligament

Angular Pregnancy This is often confused with cornual and interstitial pregnancy Angular pregnancy is defined as an ectopic gestation in which the implantation is at the extreme cornu of the uterus but within the uterine cavity The placenta may extend into the interstitial portion of the tube owing to its proximity The foetus develops in the uterine cavity This condition must be rare as very few authentic cases have been reported Munro Kerr and Anderson (1934) were the first to draw attention to angular pregnancy Up to 1957, only 14 proved cases and 6 doubtful cases were reported though many more were seen The proof of the site is by anatomical dissection of the site of implantation However, as this is not always possible, Munro Kerr laid three criteria for the diagnosis viz, (1) pain, (2) lateral distension of the uterus and (3) tendency to abortion with uterine haemorrhage

Our case satisfied these criteria Though clinically the case was mistaken for an ovarian cyst, in the absence of amenorrhoea and almost cystic asymmetric enlargement of the uterus laparotomy revealed the true nature The bluish placenta was implanted in the left cornu and was almost shining through the thinned out uterine wall The round ligament was inserted lateral to the site and the foetus, 24 weeks and alive, was growing inside the uterine cavity

These pregnancies usually terminate in abortion, or rupture of the uterus, early or late Rarely advancement to term may occur and this may be a cause of rupture of the uterus during pregnancy or early in labour If diagnosed in time, either emptying the uterus through an incision over the site or excision of the cornu can be performed Hysterectomy may be necessary if rupture has already occurred In our case, the woman was a nullipara, and the uterus was conserved A hysterotomy was done through a small classical incision and foetus and placenta were removed through the same There was no undue haemorrhage The liquor amnii was blood-stained This patient has not yet reported with another pregnancy

History of Disturbance in Early Pregnancy When carefully questioned, almost always in advanced ectopic gestation, a history of some disturbance, such as abdominal pain, bleeding, intestinal distension in early pregnancy, etc , can be elicited In 9 of our cases such a history could be elicited, in some of course in retrospect In one case an attack of right-sided abdominal pain was mistakenly treated as appendicitis She had abdominal distension again near term which was mistaken for intestinal obstruction One case had been treated as threatened abortion Three of them had attacks of pain for which they did not seek any medical aid When a pregnant woman gives such a history, one must consider it seriously in excluding an ectopic gestation In the case of secondary abdominal pregnancy after Haultain's

2 Clarke J F J and Bourge J Amer J Obst & Gyn 78 2 340 1959

3 Drury K A D J Obst & Gyn Brit. Emp 47, 3 455, 1960

4 Eastman N J Williams Obstetrics ed II, 1956, Appleton Century Crofts Inc New York.

5 Hertig and Arthur Amer J Obst & Gyn, 62, 920, 1951

6 Kerr J M M and Anderson D F Brit. Med J, 1 1113 1934

7 King G Amer J Obst & Gyn 67, 712 1954

8 Mahfouz N J Obst & Gyn Brit Emp, 45 209, 1938.

9 Mcdonald I A J Obst. & Gyn Brit. Emp, 44 5 712 1957

10 Moir J C Operative Obstetrics 6th ed, 1956, Baillière Tindall & Cox London

11 Mynors J A J Obst. & Gyn Brit Emp, 43, 1 107, 1956

12 Poddar D L J Obst & Gyn India, 8, 16, 1957

13 Reyner C and Wetchler B B Amer J Obst & Gyn, 69, 1 197 1955

14 Saleh J S Amer J Obst. & Gyn 69 1 197 1955

15 Upadhay S N Bhattacharya G R & Prakash B J Obst & Gyn India 6 76 1955

16 Wichser C & Suter M Amer J Obst Gyn, 55 489 1948



Fig 1
Case 1 V.I. Hystero-Salpingogram showing uterine shadow uterus empty and foetus outside the uterus Uterus displaced to the right.

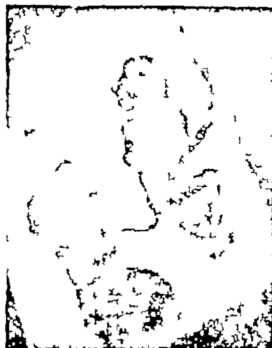


Fig 2
Case 1 V.I The foetus and placenta after removal from the abdomen

position of the foetal skeleton, deformities of the skeleton, the visibility of foetal skeletal parts posterior to the maternal spine in a lateral film, overlapping of intestinal shadows between the foetus and the abdominal wall, absence of Braxton-Hick's contractions and a shadow of the uterine wall are helpful Hystero-salpingography is often confirmatory though the exact site of the gestation cannot always be determined even with this This would not matter, as further management is surgical in all cases

Results

Secondary abdominal pregnancy is said to carry a mortality of 10 2 per cent according to collected series of Drury (1960), we were fortunate in not losing a single mother Blood transfusion and antibiotics no doubt were very helpful There were three living foetuses, two of whom were non-viable (26 weeks and 24 weeks), one term foetus was delivered alive but died after four hours due to pulmonary atelectasis One term foetus was delivered macerated An earlier diagnosis in the antenatal clinic could have saved this baby as the mother was attending the antenatal clinic One was a term lithopoedion of 3½ years' duration In the rest of the cases, the foetus was already dead irrespective of gestation age

The contra-lateral tube and ovary were healthy in all the cases and hence conserved The tube even on the affected side was healthy except for the site of nidation Hysterectomy was necessitated in one case to control haemorrhage

With early diagnosis and expert surgery, one can save the mother The life of the foetus, however, depends on its stage of development, the promptness of the diagnosis and treatment, and the absence of developmental anomalies

According to Wichset (1948) only one-fourth of extra-uterine pregnancies over 5 months will reach viability Of these, one-third will have major or minor defects incompatible with life and approximately half of all the viable living foetuses delivered from ectopic gestation will survive 8 days or more

In reporting on these twelve cases that were personally studied, I wish to express my thanks to Dr S Reddy, M D, Dr R Prabhavathi, M D, Dr C K Raju, M D, and Dr A V Narayana Rao, M D who helped me with the management of the majority of these cases I am very thankful to Dr H M Lazarus, B A, F R C S, F R C O G, F A C S, Honorary Director, Institute of Obstetrics and Gynaecology, for permission to include in the study a case of ovarian pregnancy under her care I am also thankful to the Superintendent, Victoria Hospital for Women and Children, for permitting me to include a case of secondary abdominal pregnancy who had some antenatal care in our hospital My grateful thanks are due to Dr T R Seshagiri Rao and Dr S Venkateswarlu, Professors of Radiology, for their active co-operation and assistance in the radiological investigation of these cases

References

1 Beecham W D and Beacham D W Obstetrical and Gyn Survey, 1, 777, 1946



Fig 7
Case 3 Hystero Salpingogram showing empty uterus deflected to the left, peritoneal spill and patency of left tube

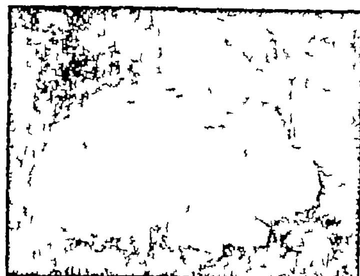


Fig 8
Case 3 G C Photograph of Lithokelyphos



Fig 9
Case 4 L.B Clinical photograph showing mass pointing to the unbilicus

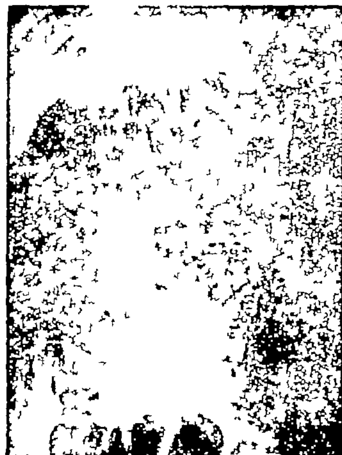


Fig 10
Case 4 L.B Skiagram showing shadow of dead foetal skeleton



Fig 3
Case 2, M V Skiagram showing foetal head high above the pelvic brim



Fig. 4
Case 2, M V Hystero-Salpingogram showing uterus deflected to the right and empty



Fig 5
Case 2, Foetus and placenta after removal



Fig 6
Case 3 G C Lithopoedion



Fig 15
Case 9 R.S Skiagram of the right horn with foetus

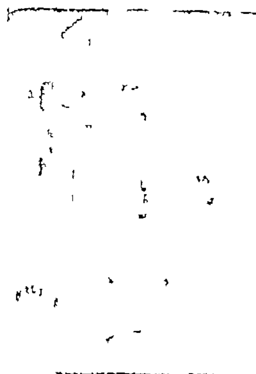


Fig 16
Case 11 R S Skiagram of ovarian mass with foetal shadow



Fig 17
Case 12, D Shows abdominal contour mistaken for a term pregnancy

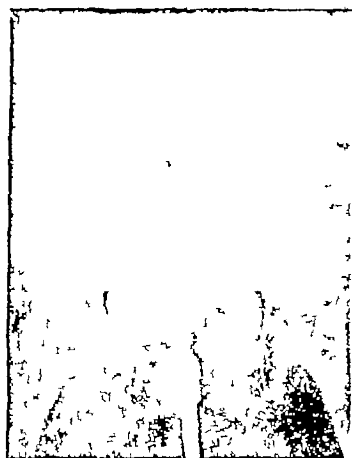


Fig 18
Case 12 D Hystero Salpingogram showing empty uterus deflected to the right and foetus in transverse lie—High position

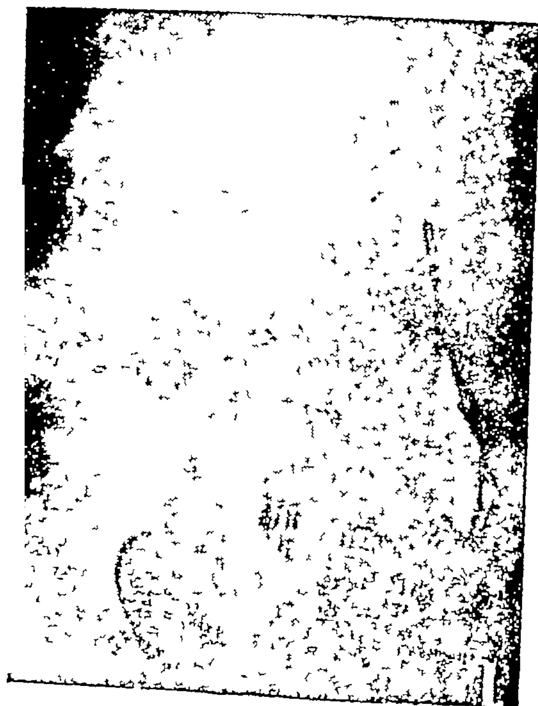


Fig 11
Case 5, P N Skiagram showing transverse lie and high position of foetus



Fig 12
Case 5, Photograph of the baby No deformities



Fig 13
Case 7, K.N Clinical photograph showing uterus with foetus in the broad-ligament The placenta was above the foetus The specimen is opened from behind

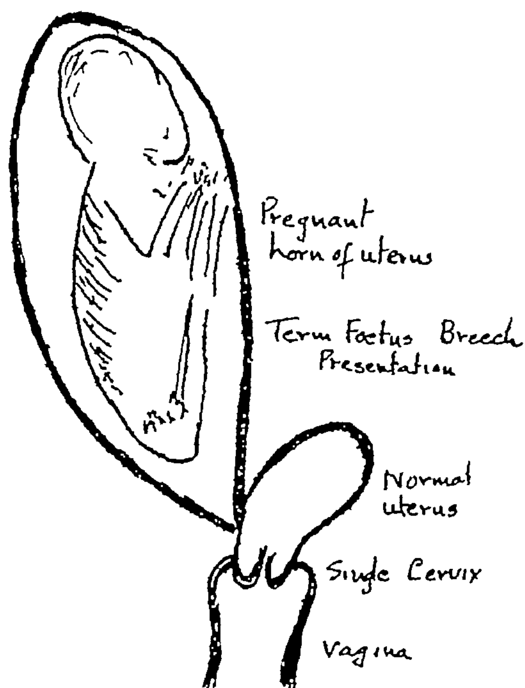


Fig 14
Case 8, B.A Diagram showing the separate right horn with foetus in extended Breech presentation

EVALUATION OF X RAY PELVIMETRY AND CEPHALOMETRY *

In 200 Cases of Contracted Pelves

by

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Conservatism in Obstetrics is fast disappearing Specially is this true in the treatment of foeto-pelvic disproportion

With the advances in anaesthesia, the ready availability of blood transfusions and the wide range of antibiotics the obstetrician of today is being fast transformed into a general surgeon We are in the atomic age; Boeings and Jet planes have overcome space and time, and life has become a continuous rush No wonder then, that with the quick tempo of life, few obstetricians have the patience and time to linger beside the parturient woman.

Prophylactic episiotomies, prophylactic forceps and if I may say so prophylactic or elective caesarean section is quite often convenient, more to the obstetrician than the patient

Even the problem of repeated deliveries in the scarred uterus of a previously sectioned patient is solved by sterilization which is being encouraged on a tremendous scale all over the country

Yet, to perform an unnecessary caesarean section is to our mind to vitiate the very ideals of sound obstetric art and science

Conservative treatment in foeto-pelvic disproportion is sometimes fraught with risk to mother and baby The treatment in cases of major or minor disproportion is no problem But it is chiefly in the treatment of borderline cases that X-ray pelvimetry and cephalometry can reduce this risk to a bare minimum Forewarned with the fairly accurate knowledge of the shape of the pelvis its important diameters and indices at the various levels, and the size of the head, one can give proper trial to borderline cases of cephalo-pelvic disproportion, those of breech presentation or previous bad obstetric history

Indications for Pelvimetry and Cephalometry

Because of possible genetic damage to the foetus and mother, however

*Paper read at the 11th All-India Obstetric and Gynaecological Congress at Calcutta in January 1961



Fig 19
Case 12, The term tubal gestation with the uterus in Situ—Picture taken on the operation table

technique This gave us the transverse diameters of the outlet and also the subpubic angle Of late we have considerably reduced X-ray exposures to the patient by using only two plates

1 A lateral plate (See plate I) with the patient standing erect against the Potter Bucky diaphragm, taking care to keep both anterior superior spines at the same level in the perpendicular and horizontal planes Tube is centred 1 c m above and behind the greater trochanter Tube film distance 36′, dosage 80 K V, 500 m a seconds A lead ruler graduated in cms is held in between the nates This plate gives us the following diameters (a) the antero-posterior diameter of the inlet, (b) the posterior sagittal of Caldwell and Moloy, (c) the posterior sagittal of Thoms, and (d) the posterior sagittal of the outlet, the depth of the pelvis the curvature of the sacrum, the shape of the sacro-sciatic notches and bore of the pelvis These diameters are corrected by setting the Schwarz ruler points, on a 10 cms distance read on the image of the lead ruler on the plate (See Schwarz Ruler)

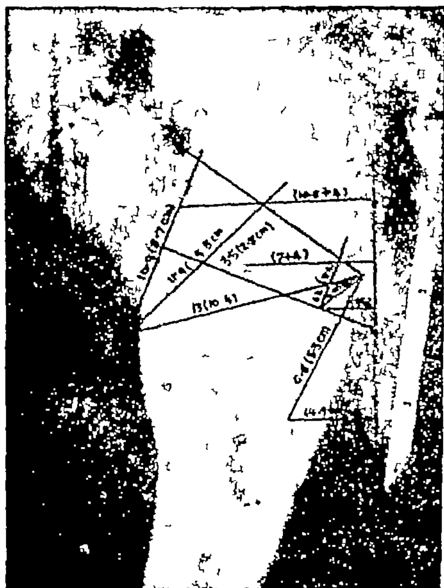


Plate 1
Showing A P diameters and the object film distances of the transverse diameters and the centre of the foetal head

small it be, it should never be done as a routine, but is indicated in

(i) All primiparas clinically suspected to have contracted pelvis, especially elderly primiparas where one has to be fairly sure of foeto-pelvic proportion before allowing a vaginal delivery

(ii) Breech presentation associated with a moderately contracted pelvis (after assessing the pelvis and baby by X-ray pelvimetry we have been able to deliver many such cases per vaginam successfully)

(iii) In all mal-presentations especially face, occipito-posterior and transverse presentation

(iv) In mid-cavity and outlet contractions of the pelvis at which levels diameters are difficult to assess clinically and contractions are often detected only during a difficult forceps delivery

(v) Cases of previous bad obstetric history (In many of these cases proved to have good indices of the pelvis we have subsequently allowed face and breech delivery per vaginam successfully, while with bad indices caesarean sections have been done)

(vi) In the conduct of labour following previous caesarean section With the aid of X-ray pelvimetry and cephalometry we have allowed many cases of previous caesarean sections done for so-called cephalo-pelvic disproportion to deliver subsequently per vaginam successfully

(vii) In repeated still-births To exclude any cause in the pelvis

(viii) In the conduct of trial labour A lateral plate at this stage is of tremendous value to show the exact level of descent or arrest of the head, the curvature and inclination of the sacrum, the depth of the sacro-sciatic notch, the length of the posterior sagital diameter of Thoms and Caldwell and Moloy

Method and Material

Our study comprises mostly of antenatal and intra-natal cases and a few of post-natal cases to study, in retrospect, the cause of a difficult forceps extraction, craniotomy or intra-partum stillbirth

Method

In the first part of our study we took three plates and used the parallax method of Hodges and Ledoux to read the transverse diameters and the iso-metric method of Thoms to read the antero-posterior diameters (for details refer to the Paper "Value of X-ray Pelvimetry in Diagnosis, Prognosis and Treatment of Contracted Pelvis" published in the proceedings of the II International Congress of the Federation of Obstetrics and Gynaecology)

In a few cases, specially where we clinically suspected outlet contraction, we took a fourth plate with a patient seated on a stool bending forwards using the Chassard-Lapine

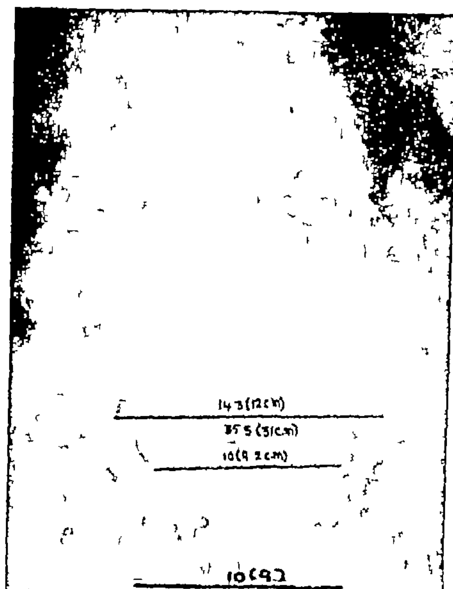


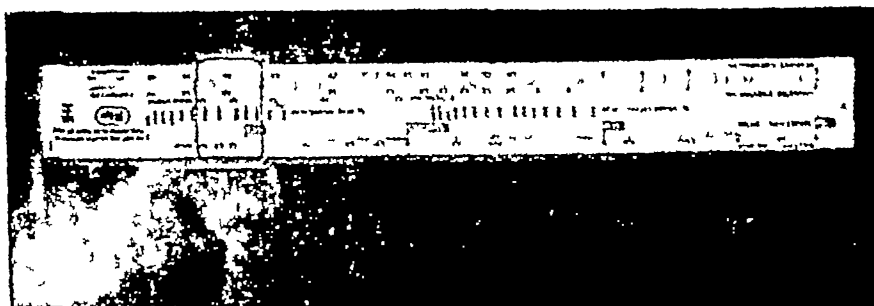
Plate 2
Showing the largest transverse diameter of the brim the interspinous and intertubeous diameters.

PLATE IV

	Final Class
(1) Any one index B with other higher values	B
(2) Any one index C with other higher values	B
(3) Any one index D with other higher values	C
(4) Two or more C indices	C
(5) Two or more D indices	D

In the final grouping, Index C or D at the inlet vitiates the prognosis of the pelvis as a whole, viz even if the indices at the cavity and outlet are As or Bs the pelvis should be classified as C or D according to the inlet alone because the outcome of labour will depend on the extent to which nature can overcome the contraction at the inlet This is very true in rachitic and osteomalachic pelves After classifying the pelvis in Class A, B, C or D the prognosis as to the outcome of labour is given thus (See Plate V)

This prognosis is entirely for the pelvis With cephalometry in our 4th series we were in a much better position to interpret the cephalopelvic disproportion The mean of the two corrected circumferences of the foetal head read on the antero-posterior and lateral are taken and the volume obtained from Schwarz



Schwarz ruler

The finder is then set on the diameter read on the plate and the corrected diameter obtained From this plate we also get the object film distance of the transverse of the brim, the interspinous, and intertuberous diameters, and the centre of the head To each of these diameters 4 cms are added for the thickness of the table intervening between the sacrum and the X-Ray plate The circumference of the foetal head is measured by a tape measure

2 An antero-posterior plate (See Plate II) This is taken with the patient standing erect, but during labour the patient is lying down The tube is centred on the midpoint between two anterio-superior spines Tube film distance 36", dose K V 100, 240 m a per second The following diameters are read (a) largest transverse of the brim, (b) interspinous, and (c) inter-tuberous Each diameter is corrected by setting the Schwarz slide ruler to the object film distances obtained on the lateral plate and the finder then gives us the corrected diameter (Ball Method) The circumference of the foetal head is also taken by a tape measure and corrected in a similar way on Schwarz slide ruler

Indices

We follow Weinberg *et al* and take the sum of the antero-posterior, and transverse diameters at the various levels of the pelvis Meingert of Chicago *et al* take the product of these diameters and base their prognosis on the percentage of the normal To find the normal, one has to read some thousands of pelves which is prohibitive to us because of the cost According to Indian measurements for the purpose of prognosis we have classified the indices thus (See Plate III)

PLATE III

	Inlet Index	Mid-cavity Index	Outlet Index
Class A	Above 22	Above 15	Above 16
Class B	21-22	14-15	15-16
Class C	20-21	13-14	14-15
Class D	Below 20	Below 13	Below 14

It is obvious that a pelvis may not have the same index at the three planes The indices at the 3 planes, viz brim, mid-cavity and outlet have to be considered jointly to finally classify the pelvis as a whole (See Plate IV)

ful adjuncts to the clinical assessment and treatment in foeto-pelvic disproportion

In the first three periods our error was 20 8 per cent In the fourth period with the aid of cephalometry and more experience it has been reduced to 10 8 per cent The overall correct prediction in 203 cases of contracted pelvis is 83 3 per cent

In period IV we have analysed in detail the prediction in each class of pelvis (See Plate VIII)

PLATE VIII

Class of Pelvis	No of Cases	Correct prognosis
A	17	100%
B	45	87%
C	14	79%
D	7	100%
Total	83	89 2%

Conclusion

The fear of damage of the hereditary genes both in the mother and the child is exaggerated According to most estimates, the radiation exposure for a pelvimetry varies from 1 to 3r whereas the damging doses of radiation vary from 10r to 400r

X-ray pelvimetry and cephalometry are of great value in borderline cases of pelvic contraction or where clinical assessment is difficult or impossible. It can never replace clinical assessment and judgement But if used judiciously it certainly can contribute a great deal towards the right conservative treatment in foeto-pelvic disproportion

Our sincere thanks are due to the past Resident Medical Officers, Dr J Bhutani, Dr H N Phadnis, Dr R J Khaunte, for their efficient cooperation, and to the College Artist, Messrs Y S Gupte and C G Katkar for the fine slides and photographs

References

1 M N Parikh & J M. De Sa Souza, Ind J Obst. Gyn Vol X No 3 March 1960
2 Albert W Quoted from Berman
3 Berman R Obstetric Roentgenology, F.A Davis Company Phila delphia, 195
4 Berman R and Sonnenblick B P Am. J Obst. Gyn , 74 1, 1957
5 De Sa Souza J M. J Obst. Gyn of India 3, 204 1953
6 De Sa Souza J M. The Value of X ray Pelvimetry in the Diagnosis, Prognosis and Treatment of Con tracted Pelvis (Paper read at the 2nd World Congress of The Inter national Federation of Gynaecology & Obstetrics, Montreal Canada 22 28 June 1958)
7 Deventer H Quoted from Ber man.
8 Parlee S S Am J Obst Gyn. 75 327, 1958
9 Steer C M. Am J Obst Gyn , 76 118, 1958
10 Weinberg A. and Scadron S J Am. J Obst. Gyn., 46, 245 1943
11 Weinberg A., Rockaway F and Scadron S J Am J Obst. Gyn 52 255 1946

PLATE V

PROGNOSIS Meaning of indices

Index	Prognosis	Treatment advised	Result expected
A	Adequate, no arrest expected	Leave patient alone	Normal vaginal delivery
B	Mild contraction	Long trial of labour	Live vaginal delivery normally, episiotomy or low forceps
C	Fair degree of contraction	Short trial	Difficult vaginal delivery or caesarean section
D	Major contraction	Very short or no trial with caesarean section	Live vaginal delivery not possible

ruler In our experience the following table shows the weight of the baby corresponding to the common volumes of foetal head —

In the treatment of contracted pelvis important factors like the mouldability of the head, coordination of the uterine forces, behaviour of the cervix and particularly cooperation of the patient have to be considered

Sometimes though by X-ray pelvimetry the pelvis is class B and a long trial is advised the proper trial may not be possible because of threatened rupture of previous caesarean scar, foetal distress, placenta praevia, malpresentations, toxaemia or postmaturity

X-ray pelvimetry and cephalometry, however, still remain very use-

PLATE VI

Cephalometry Correlation of volume of the head with birth weights

Baby's Birth Weight	No of Cases	Average Volume of Foetal Head by Cephalometry
4½ - 5 lbs	4	510 c c
5 - 6 lbs	13	590 c c
6 - 7 lbs	21	615 c c
7 - 8 lbs	2	680 c c
8 - 8½ lbs	3	800 c c

PLATE VII

Results of the X-ray Pelvimetry in the prediction of labour in 203 cases of contracted Pelvis

Period	Total No of cases	Incorrect prediction	Cause of error
I	32	12	Big baby non-dilating cervix, uterine inertia.
II	43	4	Big baby, uterine inertia
III	44	9	Very small baby, big baby, no live child, hence no conservative treatment was followed
IV	83	9	Wrongly diagnosed cephalo-pelvic disproportion by X-ray Pelvimetry
Total	203	34 (16 7% error)	

nal pelvimeter which can be used to measure the inter-ischial-spine distance, and Samuel Hanson for the same purpose had devised a recto-vaginal pelvimeter in 1938 This already shows how direct internal pelvimetry is still being used even more recently upto ischial-spine level and in the American Journal of Obstetrics & Gynaecology, September 1957, he goes all out for the revival of 1938 pelvimeter with the intention of minimising the exposure of ante-natal patients to X-rays

It is this radiation hazard which I have just referred to that is causing the revival of direct internal pelvimetry With the advent of the atom bomb all nations have become conscious of radiation hazards and these have been referred to in the Social Medicine studies by Alice Stuart *et al* in Britain (B M J , 1957) The U N Scientific Committee have in clear terms issued a statement on the responsibility of the medical profession in the use of X-ray and other ionising radiations The Committee for Medical Research in Britain, about the same time in 1956, calls attention to the same point and, again in 1958, another U.N Committee report on radiation among other things mentions the dangers of the use of X-rays I have personally had the privilege of hearing a research worker in Oxford demonstrating that all X-rays are damaging, however little or more in degree, and that there is no such thing as stimulatory dose of X-rays, which many of us still believe in The damage to the germinal cells in the gonads is the most for any given dose of X-rays An X-ray pelvimetry may deliver to the mother 2 5 to 3r and Thoms' brim view alone delivers to the foetal gonads interestingly enough, 2r, as they are closer to the tube in a cephalic presentation than the brim of the maternal pelvis in that position The risk of lukaemia in children who, as foetuses, were exposed to X-rays, has been calculated to be 1 in 8,000 and is not thought to be so great as to throw away the benefits of X-ray pelvimetry Nevertheless, obstetricians all over the world have lessened the number of X-rays taken in X-ray pelvimetry and some even satisfy themselves with only the lateral view Rohan Williams is one of them but later, in the Lancet of November 1958, he comments that the lateral view alone has its short comings The greater danger of X-rays when it occurs lies in the irreversable mutations that can arise by the breaking of hydrogen bond in the DNA

Besides the dangers of X-rays there is the cost of the plant and the rest of the equipment of the department, a separate specialist, the radiographers and other assistants and the not always a readily available pelvimetry Samuel Hanson also refers to the fact that mild errors in position, etc can give rise to sizable inaccuracy in X-ray pelvimetric measurements And then lastly to comment on external pelvimetry, the external measurements have no bearing on the internal ones and the only internal measurement, that is the diagonal conjugate and the conjugate vera obtained therefrom, can vary from 0 1 to 3 1 cm as shown by X-ray pelvimetry by Kaltrieder (1952)

All these above mentioned facts naturally have an impact on the mind of an obstetrician It was all these facts that were brought to bear on my

REVIVAL OF DIRECT INTERNAL PELVIMETRY *

by

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I must naturally commence with reasons for the word revival The word signifies that Direct Internal Pelvimetry has been in operation in the past Succeeding on the recognition of the pelvic curve by Levret, it was Smellie who in 1754 devised the method of measuring the diagonal conjugate, and described its importance in obstructed labour and contracted pelvis Incidentally, I may mention this Clinical Internal Pelvimetry is still in use today This then aroused general interest in internal pelvimetry and a variety of internal pelvimeters were devised Eastman, in the Obstetrical Gynaecological Survey of June 1948, refers to a book by Skutsch in which these pelvimeters were described and published in 1887 and reproduces some seventy-three illustrations covering full eight pages in the above reference At a glance, through these eight pages of illustrations, one is quite convinced about the interest evinced in internal pelvimetry and pelvimeter design Eastman writes, "The greatest admiration not only for inventive genius but also for the fortitude of the women who submitted to their use" as a remark and he goes on to comment on their intricacy and impracticality Then to trace the further history of pelvimetry in the various changes it underwent to modern times a few further historical facts have to be mentioned. In 1775, Baudeloque introduced the external conjugate, and other external measurements followed, which still to-date are being taught to the undergraduate In 1900, X-ray pelvimetry was introduced and by 1920 it established its unquestioned superiority over the easier external measurements as compared with the previous methods of obtaining internal measurement, because here in X-ray pelvimetry we have a method of taking the internal measurements X-ray pelvimetry displaced external pelvimetry on the grounds that the latter had no relationship to the internal measurements, though, it was just because of the reverse belief that it in turn had displaced the then combersome internal pelvimetry and internal pelvimeters However, outlet measurements are still conducted by pelvimeters like one designed by Williams (American Journal of Surgery, 1915) and by Thoms (S G O, June 1919) Also, Greenhill refers in his Obstetric text book to an inter-

*Paper read at the 11th All-India Obstetric and Gynaecological Congress at Calcutta in January 1961

bited at this Congress and the description is not very difficult If the reader has followed the manipulations carried out by me as described above in the three questions and answers, it is very simple The internal pelvimeter one A.P is designed by making the internal arms follow each of the fingers and being assembled on a joint below and the arms prolonged outwards carried further to work as a scale and pointer for direct reading of measurements on a previously calibrated scales With this pelvimeter and question (1) before one's mind, it is easy to imagine and not so difficult to measure the obstetric conjugate, A P diameter from the tip of the sacrum to the closest point on the posterior lower surface of the symphysis, and similarly a measurement mid-way, though this may not be as accurate The pelvimeter of the transverse measurement from Questions 2 and 3 has to be a recto-vaginal Here again it is even easier to see how an accurate measurement of the transverse diameter can be obtained and similarly above and below though not as accurately The arms of this pelvimeter have to be detachable so that they can be assembled after introduction The rectal arm is bent upwards to meet the vaginal arm, in order to accommodate the depth of the perineum By August 1958, Down Brothers of London prepared for me, at my instructions and directions, the improved pilot model which is also on exhibition These pelvimeters do bear a resemblance to the older ones but they are smoother The most important improvement features are the internal ends which fit like a hood on each finger and there is a window on the maximum external convexity through which the same finger can refeel the bony point identified before, which gives correct application and therefore correct reading This feature does not exist in any other pelvimeter devised up-to-date, and it is most important because it replaces the eye where the eye cannot see The shallowness of hood allows any size of finger tip to fit in The hood being small and smooth is not difficult at all to introduce and withdraw which may not be the case with the rings (and 3 different sets of sizes at that) which are presented in Samuel Hanson's recto-vaginal pelvimeter This latter pelvimeter is used recto vaginally for both, A.P as well as transverse measurements, but I feel it is more difficult to take A.P measurements recto-vaginally than just vaginally because the promontory is more directly and closely accessible through the vagina than through the anus and rectum Dr Shirodkar, the President of this Congress, has seen the Samuel Hanson's pelvimeter exhibited in Montreal in June 1958, and I had the privilege of showing him my pilot instruments in Bombay in March 1959, though I had shown him only the photographs of the prototype in London while he was passing to and fro through London in June 1958 His comment would be most valuable

Now, let us take stock of the information that will be available to the obstetrician without having recourse to X-ray pelvimetry In the clinical assessment there are the diagonal conjugate the hollow of the sacrum curved or flat the breadth of the

mind when I was in London in 1957 and 1958 and it made me to look for a way out of these difficulties I naturally thought the way out lay in the way back to Direct Internal Pelvimetry, because after all we still rely on our clinical judgment and that is why we pay so much attention to the pelvic assessment, done specially in the case of every primigravida at the 36th week when among other things a diagonal conjugate measurement is attempted to be taken It therefore occurred to me, by pure accident at one of these clinical assessments I was conducting, whether I could find an answer in the affirmative to each of the following questions I asked to myself

Q 1 Can the whole of the posterior surface of the symphysis be felt by the left index finger, all the time the tip of the right middle finger was at the promontory and similarly at any point below in the middle line of sacrum down till the tip? (In other words the index finger of the left hand was being used in the reversed direction)

A Yes The result was I could under the circumstances stated feel the whole of the posterior surface of symphysis with the left index finger and in doing so no further discomfort was experienced by the patient than while measuring for the diagonal conjugate

Q 2 If the ischial spine can be felt per vaginam as also the area of the bone towards its base by the right index finger, how high is it possible [illegible] further reach up into the pelvis on [illegible] through the right lateral [illegible]

[illegible] found that the right index finger in the [illegible] after feeling the ischial spine and the adjacent area of the bone near its base, could reach about 1 to 1½" higher on the side wall to very near the brim in the shallower pelvis

Q 3 While (2) was being tried is it simultaneously possible to do the same on the left side with the left index finger introduced through the anus and rectum?

A Yes The same palpation of bony points was simultaneously possible on the left side as described in the question and to reach as high The discomfort caused to the patient was even less and practically negligible as compared with (1), precisely because neither the vagina nor the rectum was in the slightest being stretched, but only each was being moved to its respective side by the respective finger

There was the answer how to a great extent the loss caused by omitting X-ray pelvimetry could be reasonably bridged, viz. by direct internal pelvimetry with internal pelvimeters The design of such pelvimeters was already in mind, and that is why the unorthodox clinical pelvimetry just described to answer the three questions was performed This I did while I was in Lewisham Hospital, London, in February 1948, while I was working with the consultant Mr. Gunn and the Senior Registrar Mr Rees In April 1958 while in the same hospital with the co-operation of Mr Paterson, the hospital Engineer, the foreman Mr and Mr Pope one of the workmen, I cut out of aluminium sheeting and assembled two pairs of proto-type internal pelvimeters which I tried on a patient in that hospital

The instruments are being evalu-

of assessment and measurement is done

That these measurements can be taken I have satisfied myself and there is the authority of Samuel Hanson who from 1938 to 1957 has conducted ten thousand cases with internal measurements obtained with his pelvimeter Now, therefore what has to be done in the future is that these assessments and measurements should be utilised in giving a forecast in cases of suspect pelvis and the forecast should be checked up against what really happens Then we will have an assessment of the utility of Direct Internal Pelvimetry with internal pelvimeters There is no urgency as X-rays are still in vogue though minimised, but it would be better to consider the alternative method not just because of the dangers of X-rays but because also of the cost and a separate specialisation therein involved



Fig. 1

1 Inner end of the pubic side of Pelvimeter A.P 1 showing the position of window in the maximum curvature of the hood contacting the pubic surface.
2 The sacral end of the Pelvimeter I.A.P showing the window in the maximum curvature contacting the promontory etc.
3 & 4. Are the inner side and outer side of inner end of Pelvimeter II transverse showing the position of the window on maximum curvature that comes in contact with the Ischial spin or side wall of the pelvis.

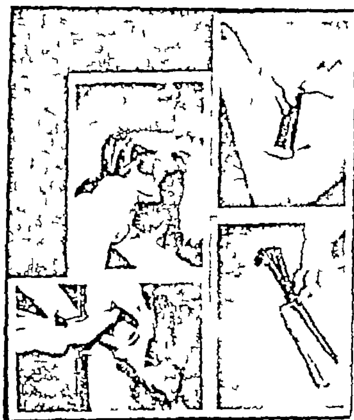


Fig 2

Note These are the proto type of Internal Pelvimeter 1 A. P and Internal Pelvimeter II Transverse the two arms of the latter are coupled with a Butter fly nut.
2 Shows Pelvimeter 1 A.P with hands in position, as while in use
3. Shows Inter Pelvimeter II transverse as though in use The left hand fore-finger is through the rectum while the right finger is through the Vagina.

sacro-sciatic notch, the ischial spines and their character, the nature of the anterior quadrant (quadrants as per "Modern Obstetrics" by Stern Burnett), the sub-pubic angle, the direction of the rami whether sloping backwards or not At the outlet, one has the transverse diameter, the posterior saggital and the Morris's disc fitting method under the pubic arch It will be seen from this list that the obstetrician is surer of the outlet than mid-canal, because measurements higher up in the canal are not available

Now, with the use of these pelvimeters one can get the antero-posterior measurement at the brim at mid-cavity and at the lower end of the sacrum This naturally obviates the lateral X-ray picture Further, one has the transverse measurement above the level of the ischial spines at the level of ischial spine and below that level up to the outlet This obviates the straight A P picture and gives an idea of the converging or diverging or parallel side walls, similarly as the previous set of measurements would also supply the same information in regard to antero-posterior walls It is true that by omitting the Thom's brim view one loses the most important information, viz the shape of the inlet, but this is to some extent made up by the anterior tour of the examining fingers during the clinical assessment, when the experienced obstetrician will be able to judge the roundedness or the beaking of the anterior quadrant Furthermore, it will be also possible with the recto-vaginal transverse pelvimeter to measure the breadth of the sacro-sciatic notch This measurement may throw some light on the posterior saggital at that level coupled with the information regarding the hollow of the sacrum obtained during the clinical assessment, as also the actual measurement of the posterior saggital at the outlet From the foregone list of assessment and measurements it is possible at least, to mostly do without X-ray pelvimetry because of the little more information in measurements obtained by the use of these pelvimeters Of course, the question of trial labour is still there and it still has to be decided whether a particular head will engage in a particular brim, but having once entered the pelvis we have also to be fairly certain that this head will emerge through the canal and outlet It is only in this latter that these pelvimeters are useful and in avoiding, to a great extent, difficulty in the mid-cavity and outlet With their use in conjunction with clinical assessment the errors in the canal and outlet will be practically ruled out and will be only minor They will also be rare because it is common experience that a well engaged head generally does not unduly give trouble at levels below, so much so that some are inclined to neglect minor degrees of contraction in mid-cavity and outlet Say for instance, this minor degree has inadvertently occurred in spite of all the care proposed, we have still the operation of symphysiotomy which can come to our rescue I would prefer this to what is called trial of forceps and subsequent caesarean section if necessary and for another thing this latter is extremely unlikely if the above mentioned programme

STUDY OF SACRUM AND POSTERIOR SAGITTAL DIAMETER IN CASES OF OCCIPITO POSTERIOR POSITION IN RELATION TO MIDFORCEPS DELIVERY *

by

PRADYOT KUMAR KHAN M.O (Cal),

In 50 cases of occipito-posterior position of vertex, where assistance of forceps was necessary due to arrest in the midcavity, X-ray pelvimetry was done in the puerperium Particular attention was paid to the curvature and depth of sacrum and accurate measurement of the posterior sagittal diameter of the midcavity

(The occipito-posterior position was confirmed by doing vaginal examination in the late first stage of labour and the designation was given only when the posterior fontanelle was behind the transverse diameter of the pelvis)

Method of Pelvimetry

Lateral view of the pelvis was taken in all these cases A line was drawn from the sacral promontory to the tip of the fifth sacral vertebra and maximum depth of the sacrum was found out by drawing series of perpendiculars upon this line In this series of cases the study of the sacral curvature reveals three types in relation to the outcome of labour They are the following

Well curved sacrum	— Where the maximum depth was 2.5 cm. or above
Moderately curved sacrum	— Where the maximum depth was between 2 and 2.5 cm.
Flat sacrum	— *Where* the maximum depth was below 2 cm.

*Paper read at the 11th All India Obstetric and Gynaecological Congress at Calcutta in January 1961

Evaluation of the findings

While it was found that the depth of the sacral curvature plays an important role in deciding the manner of rotation of the head, it was also observed that the sacral accommodation was to an extent dependent on the available length of the posterior sagittal diameter It is however true that a well-curved sacrum is attended with a longer posterior sagittal diameter than a flat or even a moderately curved sacrum The outcome of labour in each type of case, with individual measurement, is being shown in the following table (see next page)

A *Well-curved sacrum with the depth of 2 5 cm or above associated with adequate posterior sagittal diameter measuring above 8 cm*

There were 8 cases available in this group Early examination revealed that the head was deflexed and presented by occipito-posterior position When the second stage was well established and the biparietal diameter came to the level of interischial spinous diameter complete rotation of the occiput took place and delivery with the assistance of forceps was necessary because of prolonged labour and uterine inertia

B *Well-curved sacrum associated with inadequate posterior sagittal diameter measuring less than*

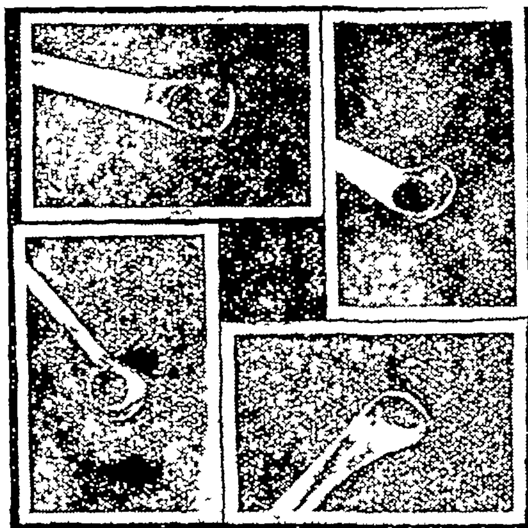


Fig 3

3 & 1 shows the corresponding pilot instruments

4 Oblique view take to show the instrument in position measuring the Obstetric Conjugate in a pelvis

2 Shows Pelvimeter II Transverse measuring the transverse diameter at the level of the Ischial spins

Note the distance between the right thumb and ischial tuberosity similary on the left side between the ischial tuberosity and the external left middle finger These approximately show the distance by which transverse measurement at higher level can be taken

pubis delivery was done by applying forceps with axis traction

E. *Flat sacrum associated with inadequate posterior sagittal diameter*

Seven cases were available in this group In this series the head rotated only up to the transverse diameter and arrest in this diameter occurred In spite of allowing sufficient time in the second stage spontaneous rotation did not take place Manual rotation and delivery by forceps with axis traction had to be done in 5 patients and in the remaining two cases Kielland's forceps were used for rotation and extraction

According to the old school of thought, founded by Berger, Solayre De Renhae and Naegele, the head usually presents at the brim in the oblique diameter Now-a-days it is realised that the head usually enters the pelvis with the sagittal suture in or nearly in the transverse diameter of the pelvis In cases of occipito-posterior position of vertex the occiput lies behind the transverse diameter, but with the progress of labour in nearly 80% of cases the occiput comes down to the level of ischial spines meets the resistance of the pelvic floor and spontaneously rotates to the anterior position In the remaining 20% of cases the occiput does not rotate or rotates incompletely This non-rotation or incomplete rotation of the occiput brings about arrest of labour in occipito-posterior position and dystocia commences

With this idea in view the author studied the two distinct entities of the pelvis e g sacral depth and posterior sagittal diameter Various permutations and combinations were found out and the outcome of labour has been shown

From the data it is seen that well curved sacrum with adequate posterior sagittal diameter is the most favourable pelvis where spontaneous rotation of head is the rule This type of pelvis was available in only 16% cases of occipito-posterior position pelvic configuration by supero-inferior radiological pelvimetry of the brim showed the pelvis to be either of gynaecoid (pure) or gynaecoid with anthropoid tendencies

Well-curved sacrum may be associated with shorter posterior sagittal diameter In this type of pelvis the long arm of the foetal head is not accommodated in the narrow posterior sagittal diameter and the small area that is the occiput avails of this diameter, rotates backwards and accommodates in the hollow of the sacrum 20% cases were of this type in this series

Moderately curved sacrum with adequate posterior sagittal diameter does not prevent rotation of the head but due to the shallowness of the sacrum the posterior pole of the foetal head is prevented from accommodating in the hollow of the sacrum and the head gets arrested with the occiput in the anterior oblique position Twenty-six per cent of cases belonged to this group

When the shallowness of the sacrum is not compensated by adequate posterior sagittal diameter spontaneous rotation of the head does not occur because neither pole of the foetal head can avail of the depth of the sacrum or posterior sagittal diameter as a result arrest of labour

Measurement in detail of the Sacral Depth and Posterior Sagittal Diameter with the outcome of Labour

Group	Depth of sacrum	Post sagittal	No of cases	Outcome of labour
A	2 8 cm 2 7 cm 2 5 cm	8.5 cm 8.1 cm 8 5 cm	2 3 3	Spontaneous rotation of occiput.
B	2.9 cm 2 8 cm 2 5 cm	7.5 cm 7 9 cm 7 cm	5 3 2	Rotation of occiput to the sacral hollow
C	2.3 cm 2 2 cm.	8 5 cm 8 1 cm	9 5	Rotation of the occiput up to the anterior oblique diameter
D	2.3 cm 2 1 cm 2 cm	7 6 cm 7 cm 7 5 cm	6 3 2	Head was arrested with the occiput in the obliquely posterior position
E	1 9 cm 1 4 cm 1.5 cm	7 cm 7 7 cm 7 45 cm	4 2 1	Transverse arrest of the head

8 cm due to the position of the ischial spines

In this group the depth of sacrum was good and the posterior sagittal diameter was less than 8 cm Ten cases were available in this group In these cases the occiput rotated backwards and persistent occipito-posterior position occurred Forceps were applied on the head, and face to pubis delivery was performed

C *Moderately curved sacrum associated with adequate posterior sagittal diameter*

In this group of 14 cases where the head was in the occipitoposterior position, the rotation of the head took place and the occiput came anteriorly up to the anterior oblique diameter of the pelvis In 8 cases the head was rotated through the rest of the circle manually and forceps delivery was performed, in the remaining 6 cases the forceps with axis traction were applied on the obliquely placed head and when traction was given on the axis traction handle the head rotated and delivery took place in the directly anterior position

D *Moderately curved sacrum associated with inadequate posterior sagittal diameter*

In 11 cases of this group the head was arrested in the posterior oblique diameter of the pelvis Manual rotation was successful in 9 patients and forceps extraction was done Out of the remaining two patients, in one manual rotation could be done up to the transverse diameter of the pelvis and the rest of rotation was completed by Kielland's forceps and delivery by the same was carried out In the remaining one case the occiput could not be rotated anteriorly because disimpaction from the station of arrest was not possible Face to

SYMPHYSIOTOMY *

by

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No operation has had a more chequered history in Obstetrics than that of symphysiotomy As early as 1655 Claude de la Courvee performed it on the dead as an alternative to post-motem caesarean section.

However, it was Sigault who performed it for the first time on the living in 1777 For a few succeeding years it was performed many times especially in Italy, France and Germany Baudelocque was a strong opponent of it and it was soon abandoned entirely

After an interval of 100 years, interest in it was again aroused by Morisani of Italy Soon Pinard, Varnier, and Bar in France, and Zweifel in Germany followed suite and in the last decade of the 19th century it was the burning question in obstetric surgery Again in the beginning of the present century, pubiotomy advocated by Van de Velde, Gigli and Doderlein, almost completely supplanted symphysiotomy But there remained a few, amongst whom was Frank, who even in 1912 advocated it and presented a series of 117 cases with one maternal and eleven foetal deaths

British and American obstetricians never viewed either operation with favour In modern times, since caesarean section is so safe and easy a great revival in symphysiotomy is doubtful Nevertheless, since pelvic radiography has demonstrated a definite and permanent increase in all transverse diameters and especially those of the outlet, it is worthwhile considering symphysiotomy, in certain selected cases of funnel shaped pelvis and outlet contraction and the results are gratifying As Smellie has very wisely said well over 150 years ago "We ought never to trust too much or be over sanguine in respect to any particular method of practice, but vary the same as we feel *it necessary*"

Indications

(1) Pelvic deformity affecting the outlet In a funnel-shaped pelvis when the inter-tuber ischii is 3¼" or less or below 8 cms and one is confronted with a difficult forceps extraction, symphysiotomy is an example *of finesse in obstetric surgery* Late in labour when the head is deeply *jammed in the pelvis*, when the lower segment is thinned out and oedematous and vulnerable to tear easily during attempts at extraction of the head, when the patient is exhausted after many hours of labour, and infected after many vaginal examina

*Paper read at the 11th All India Obstetric and Gynaecological Congress at Calcutta in January 1961

occurs in the posterior oblique position of the occiput

Bad sacrum with deficient posterior sagittal diameter brings about an absolute shortening of the antero-posterior diameter of the pelvis In this group of cases, the arrest takes place in the transverse diameter as there is no available space in the antero-posterior or oblique diameter of the pelvis

From these cases it is seen that the dystocia in a case of occipito-posterior position is due to non-rotation of the occiput, and the rotation is influenced by various factors which may be anywhere in the passage, power and passenger Leaving aside other factors it is seen that the depth of sacrum and posterior sagittal diameter influence the rotation of the occiput not to a small extent It may be rightly concluded that the outcome of labour can be predicted with surety in a reasonable percentage of cases when the sacral depth and posterior sagittal diameter are known to the obstetrician, provided other factors behave normally Roth (1953) states, "If the sacral curve is determined by roentgen study, and the location of the tip of the sacrum with reference to the ischial spines is determined clinically, one can readily visualise the location of the sacrum in its entire course This is particularly important as the sacrum is occasionally either angulated anteriorly or inclined posteriorly, influencing greatly the space available in the posterior segment This sacral curve often, therefore, has a determinant role in intrapelvic rotation, either as a part of spontaneous labour or in operative obstetrics Knowledge of the sacral curve is important in making prenatal predictions of the probable mechanism of descent in labour With a thorough knowledge of any individual pelvis, plus these principles, one readily and accurately predicts the most likely mechanism of labour and the best possible solution to possible positional dystocia, should that arise in labour"



Fig 1
Bistoury inserted flat against the Symphysis Pubis jt



Fig 2
Bistoury turned to a rt angle to bring the cutting edge against the S P jt.

tions and attempts at vaginal delivery, caesarean section involves greater risk to the mother Even if all these disadvantages are overcome by the modern facilities of broad spectrum antibiotics and blood transfusions, a caesarean section at best leaves the patient with an uterine scar and the original pelvic deformity, which will trouble the patient more in subsequent labours with bigger babies

(ii) In exceptional cases of malposition of the vertex like occipito-posterior, deep transverse arrest or face presentation where both manual and forceps rotation has failed, traction will be great and craniotomy is the only alternative, A timely symphysiotomy just allows the head to be easily rotated and pulled out with ease It is most valuable in a primipara with a breech arrested at a contracted outlet After symphysiotomy breech extraction becomes easy and the head just slips out

(iii) Symphysiotomy has an ethical indication With the probability of having to do repeat caesarean sections in contracted outlet of the pelvis, contraception and sterilization has to follow very soon Obstetricians working in Roman Catholic communities and especially where sterilization is not allowed by the Roman Catholic Church and where families tend to be large, one can employ symphysiotomy which permanently cures an outlet contraction and allows future normal labours

Method

In olden days the symphysis was devided by the open method and, in modified forms, it has again been used in recent years by the Dublin workers I have preferred the subcutaneous technique The patient is anaesthetised, placed in the lithotomy position and her pelvis brought to the end of the operation table The legs should not be fixed on supports, but two assistants should hold them so as to be able to regulate the degree of abduction of the thigh with one hand and apply steady pressure on the trochanter with the other hand Before division of the joints forceps may be applied to the head provided the position is satisfactory If position is abnormal, because of the outlet contraction, forceps should not be applied until after division of the joints when the head can be more easily rotated into the ideal position and blades properly applied A catheter is inserted into the urethra A small transverse incision about 2″ in length is made over symphysis pubis The rectus sheath and the fibres of rectus muscle separated from the upper border of symphysis pubis The handle of the bistoury is first passed along the posterior surface of the pubis, separating the joint from the adjacent structures The handle is withdrawn and blade of the bistoury is inserted flat against the pubic joint guided with the left index finger in the vagina (see fig I) It is then turned to a right angle bringing the cutting edge against the pubic joint (see fig II) With movements to and fro the joint is cut into from above downwards and behind forwards When $\frac{3}{4}$th of the joint has been cut, the legs are abducted with careful pressure on the trochanter and the rest of the joint is felt to separate with the left finger in the vagina Now the whole joint should never be cut and the separation of the lower

Case Reports

The first case was a very fat primipara well built and tall, in whom no one would suspect pelvic contraction The head was arrested at the outet. A big caput could be seen, but even with moderate forceps traction no advance was made It was a precious baby the patient being an elderly primipara about 34 years of age having conceived after many years of treatment Symphysiotomy as described by the sub cutaneous method was done and an 8 pound baby delivered The recovery was uneventful I do not know if she has had any more deliveries

The second was a young primipara in whom X ray pelvimetry showed definite marked outlet contraction See fig III Clinically the head with a big caput and marked moulding was jammed at the out let, the sagittal suture lying transversely A subcutaneous symphysiotomy with a bistoury was done and head delivered after an episiotomy This patient had oedema of the vulva not anterior near the pubic joint but near the episiotomy wound It cleared with mag sulph compresses, etc Patient was not allowed to move for 48 hours and then was turned on one side from time to time. The self-retaining catheter was re moved on the 11th post-operative day but the urine was always clear On the 3rd day she turned in bed herself sat up on the 21st day and walked on the 27th day

Nowadays they make them leave the bed even as early as the 8th or 10th day X-ray pelvimetry (See Table) shows increase in all trans-

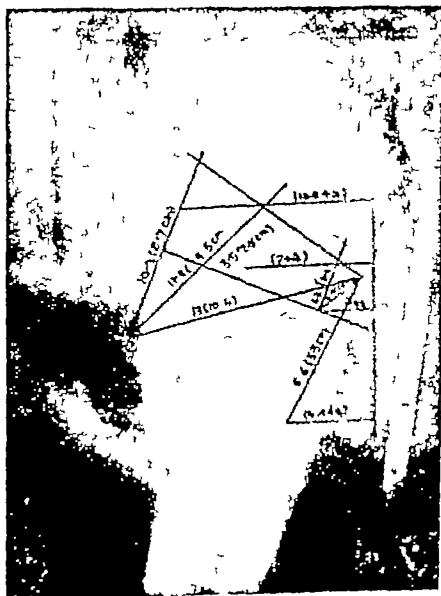


Fig 3
Note the narrow and deep sacro-sciatic notch the straight sacrum and the marked moulding of foetal head

half of the joint must be gradual as otherwise severe haemorrhage can arise from the inferior vesical plexus and the dorsal vein to the clitoris Usually the haemorrhage is controlled with pressure and packing for a while The child is now easily extracted by forceps after a liberal episiotomy, to relieve the pressure of the head on the unsupported urethra and vestibule The wound is closed in layers leaving behind a cigarette drain We strapped the pelvis with 3 layers of 4" wide sticking plaster which was removed completely after 35 days The patient was not allowed to turn in bed only for 48 hours Then she was turned on one side or the other for 7 days, then allowed to turn on her own She sat up after 2 weeks and walked after 3 weeks

Disadvantages and complications

(i) Haemorrhage from the inferior vesical plexus and the dorsal vein of the clitoris and injury to the urethra and bladder Both these can be reduced to a minimum if only the upper half of the pubic joint is cut through and the lower half is allowed to separate by gentle abduction of the thighs If haemorrhage occurs firm packing of the vagina and of the wound in most cases controls it A self-retaining catheter should be left in for 5 to 7 days Episiotomy after symphysiotomy, before extraction of the head reduces the strain on the unsupported urethra and prevents injury to it and the bladder, especially that of stress incontinence

(ii) Troublesome after-treatment Prolonged convalescence The patient is unable to lift her pelvis and turn in bed by herself for at least one week. A pulley attached to the top of the bed with strings clipped on to the patient's binder assists greatly in lifting up the pelvis for bed-pans etc Especially designed corset coming low over the trochanter has been used by Dublin workers but I have been contented with strapping broad elastoplast about four inches wide wound 3 or 4 times round the pelvis at the level of the trochanters I encouraged the patient to lie on one or other side during 3 weeks of her convalescence Many allow the patient to leave the bed on 10th or 11th day

(iii) Difficulty in locomotion Union of the pubic joint is fibrous, but it does not produce any pain, instability or difficulty in walking After one month the patient could stand on one leg and hop and jump and even squat down without any pain

The advantages of symphysiotomy over pubiotomy are the following —

1 Much less bleeding, as you do not have to disturb the rich plexus of veins behind the pubic arch

2 No need of wiring and hence symphysiotomy is a much simpler operation

3 As you do not cut through the bone tissue there are less chances of osteomylitis and much less pain after symphysiotomy Moreover in pubiotomy you have two wounds, one above and one below the pubic bone and therefore more chances of sepsis, while in symphysiotomy you will have only one above the symphysis pubis

Case No 1

Shrimati S F aged 39 years Para 11 + 0 was seen in the out patients department on 1st August 1959 with a history of pain for the past one year She complained of giddiness and weakness for 6 months Her pain started in the symphysis pub s and right sacroiliac joint a year ago when she was 5 months pregnant The pain was mild at the onset became severe later radiated to the back of the right th gh upto the popliteal fossa and made ambulation difficult. Movement in the bed specially turning on the side precipitated an excru ciating pain with the result in the last two months of the last pregnancy she was almost bed ridden She was delivered of a full-term child 8 months back The child was small but the labour was prolonged and lasted 3 days It was conducted by a dai at home Pain persisted with same severity for 2 months after delivery then improved stead ly but still walking was a trial for her She had no treatment except some indigenous remedies

She had 11 pregnancies first and third being breech First delivery was by breech extraction under general anaesthe-s.a and baby was still born Ninth was twin pregnancy with hydamnios She had premature delivery and both twins died soon after birth She had no pain in the pelvic bones in first three pregnancies From fourth pregnancy onwards pain in the pubic symphysis was felt which be came worse in the succeeding pregnancies and during the 10th pregnancy it was associated with the bony pains in the limb resulting in limitation of movement Her sleep was disturbed and in the last 2 weeks of pregnancy she was confined to bed. She was delivered of an average sized infant at term Labour was normal but on fourth post partum day when she made an attempt to get up she found it impossible to do so due to excruciating pain in her legs and pelvis. She rema ned so for a month and was taken to the orthopedic clinic of Irwin Hospital New Delhi. She was treated with some injections medi cines and was advised to wean the baby She recovered completely in about 2 months time Pain returned in the 11th pregnancy as described above Menarche was established at the age of 13 years and periods were regular coming every 30 days lasting 4-5 days

On examination she was short statured Her height was only 4ft 6in She was anaemic She walked with a waddle putting more weight on the left foot The locomotion was distinctly very painful There was nothing abnormal in cardio vascular resp ratory digestive and nervous systems On standing the right gluteal fold was higher than the left There was suggestion of scoliosis in the lumbar spine Right sacroiliac jo nt was tender There was a gap between the two pubic bones at the symphysis and their mobility could be elicited by making the pat ent raise her right foot first and then the left foot. On vaginal examination uterus was retrovert ed normal size mobile and there were no adnexal masses or tenderness. Pelvis was generally contracted, promontory was easily reached Diagonal conjugate was 4′ The gap between the pubic bones and their mobility could be demonstrated more easily with a finger in the vagina

Following investigations were done —

4 8 59—Blood haemoglobin 8 gms % R.B C 3 8 mil/cmm Blood picture showed hypochromic normocytic anaemia

24 8 59—R.B C 3 9 million/cmm Hae moglobin 10 gms % W.B C 6900 cmm Polymorphs 60% eosinoph ls 0% lympho cytes 40% E.S R 40mm/min

24 8 59—Serum calcium 10 43 mg/100 ml Inorganic phosphorus 5 0 mg/100 ml Total serum proteins 6 8 gm/100 ml Albumin 2 8 gm/100 ml Globulin 4 0 gm 100 ml

Total proteins by electrophores s 6 gm % Albumin 44% α_1 and α_2 globulins 14 90% β Globulin 15 70% γ globulin 25 40% Urine—Bence Jones proteins were not found in urine

5 9 59—Serum billirubin 0 3 mg/100 c c, Thymol turbidity 4 mls

X ray Pelvis —Showed a generally con tracted pelvis with wide separation of the symphysis pubis and subluxation of the right sacroiliac joint. Rocking movement at the symphysis while patient s ood on one foot alternately (Figs 1 2) was de monstrated

PELVIC ARTHROPATHY IN PREGNANCY *

by

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Pelvic arthropathy is a term used by James Young to describe the lesions produced during pregnancy by relaxation or rupture of the pelvic ligaments Varied terminology has been used for this condition, e g (1) Pubic arthropathy (2) Disruption of the symphysis pubis (3) Rupture of the symphysis pubis (4) Spontaneous symphysiotomy (5) Fracture of the symphysis (6) Pubic sub-luxation (7) Sacroiliac arthropathy (8) Sacroiliac strain (9) Split pelvis (10) Pelvic arthralgia and (11) Sub-luxation or displacement of sacroiliac joints Where both sacroiliac and pubic subluxations are present it is known as pubosacroiliac arthropathy

On account of the scarcity of cases reported, the condition is thought to be uncommon Five cases of spontaneous rupture of symphysis pubis, reported by Reis et al, occurred in 25000 deliveries Nemee reports an incidence of 1 in 6072, Von Fernwald 1 in 10,000, Schauta 3 in 3000, Kayseround 3 cases in 944,000 consecutive deliveries at Schauta and Chrobak clinic On the other hand, to quote Boland, this rarity is more apparent than real It is likely that many cases are being missed This is evident when we consider the figures of those workers who have specially looked for the lesion Boland in 1933 reported an incidence of 1 in 500 from Boston lying-in Hospital and 12 of his cases were seen in 2 years' time among 6263 deliveries James Young in 1940 gave his figure of 0 75% of severe variety, where both sacroiliac and pubic joints were involved (Table I) In milder forms of sacroiliac strain, the condition may be much more common Many of the chronic backaches, as sequelae of pregnancy arthropathy, may be lost to the obstetrician and land up in the orthopedic clinics Three such cases picked up in the gynaecological outpatient department and remaining two cases seen in the obstetric unit are reported here

TABLE I

(1)	Reis et al	1 in 5,000
(2)	Nemee	1 in 6,072
(3)	Von Fernwald	1 in 10,000
(4)	Schauta	1 in 1,000
(5)	Kayser	1 in 31,333
(6)	Boland	1 in 500
(7)	James Young	1 in 75
(8)	Present Series	1 in 100

*Paper read at the 11th All-India Obstetric and Gynaecological Congress at Calcutta in January 1961

of pain in the pubic region for 1½ months following a normal del very She had had five full term normal deliveries last was 1½ months ago After this deli very, on her 4th post partum day on getting up she felt acute pain in the region of the symphysis pubis S nce then the pain had persisted though of lesser degree but was felt more on walking and on changing the side in bed

On examination there was slight tenderness and slight gaping at the pubic sym physis On leg elevation movement at the joint was felt and a friction sound could be heard

X ray—8250/60 revealed dislocation of the symphysis pubis She has been ad vised a pelvic jacket mult vite and high protein diet but she has not reported back for follow-up

Case No 4

Mrs K S Reg No 2970 P1 + 0 a nursing sister pregnant 24 weeks came with a complaint of discomfort in the pubic symphys s Patient gave history of having had acute onset of this pain as she was getting out of bed on 5th September 1958 during the 37th week of her first pregnancy She felt a creaking sensation in the pubic symphysis at the same t me Thereafter she had difficulty and pain on walking and on turning in bed This re mained throughout the remain ng part of her pregnancy She was then treated by orthopedic surgeon by complete bed rest calcium injections and vitamin B_1 injections She had a normal delivery on 26th September 1958 of 4½ lbs baby after an episiotomy Pain persisted for 6 months after this delivery and she wore a pelvic jacket After 6 months the pain disappear ed so she discarded the jacket

During her 2nd pregnancy she had re currence of this pain which was milder than before and was felt only when turn ing in bed She had a normal delivery on 14th August 1960 male baby weighed 7 lb—4 oz. X ray on 16th August 1960 revealed separation of pubic symphysis (Fig 5) During her stay in bed for 9 days post partum the pain was very mild but she returned home The walking and turning in bed was somewhat painful and she resumed the use of corset with relief

Case No 5

Patient C K Reg No 3324 30 years P3 + 0 was admitted to the All-India Institute of Medical Sciences Hospital on 30th August, 1960 with the complaint of mild labour pains. She was 36 weeks pregnant. She also had pain and tender ness over the pubic symphysis for last 10 years This had started during the 36th week of her first pregnancy as she was running in the field This pa n was relieved soon after the delivery but recurred in each succeeding pregnancy and was worse during walking or bending She had had three normal deliveries w th average size babies youngest was a girl of three years

On examination she was a moderately built woman Her cardiovascular and res piratory systems were normal B.P was 120/80 mm Hg Abdominal examinat on revealed uterine size of 36 weeks preg nancy Foetus lay in left occipito-anterior position Foetal heart sounds were 140/ min heard in the left lower quadrant Head was free There was tenderness and gaping over the pubic symphysis On vaginal examination the gaping was felt. She had a cystocele and rectocele and normal pelvis. She was not in labour She was kept in the hosp tal for the pubic pain and given bed rest high protein diet, vitamins and iron orally X ray of pelvis No 11581 on 30 8 60 revealed separation and sliding at the pubic symphysis (Fig 6)

She had normal delivery on 8th Septem ber 1960 baby weighed 6 lb—6 oz. After the delivery the pubic pain was persisting She was discharged ambulatory on 19 9 60 with a pelvic corset to limit the move ments at the pubic joint

She was seen on 31 10 60 (8 weeks after the delivery) and pubic pain was consider ably less. (Table II)

Discussion

The main interest in reporting these cases lies in the difficulty such cases present in diagnosis Many of them may be diagnosed and treated as osteomalacia In case No 1 the provisional diagnosis was the same History of difficult delivery in a grand





Figs 1 & 2
Case No 1 X-rays of the pelvis showing separation at the pubic symphysis Rocking movement is elicited by making the patient stand on left and right foot respectively

Patient was treated with bed rest, was given iron, multivite tablets, Imferon injections and high protein diet, to combat her anaemia and low general health Her general condition as well as the limp improved considerably and pain became less Tubal ligation was done by Pomeroy's technique from which she made an uneventful recovery She has been given a pelvic jacket, and with the restriction of movements at the pelvic joints, she has improved still further She was almost asymptomatic when seen on 14th October, 1960 (13 months later) though the repeat X-ray showed persistance of the gap in the pubic symphysis (Fig 3)



Fig 3
Case 1 X-ray taken 13 months later shows no radiological improvement through patient symptomatically markedly improved

Case No 2

Mrs S K aged 35 years para 9 + 5 was first seen on 26th October, 1959 with the chief complaint of pain in the lumber region for 1¼ years She had had 9 full-term normal deliveries and 5 abortions of 2-3 months in between her full-term pregnancies Her last child was 1¼ year old and was alive and well She started the pain at pubic symphysis 10 years ago, in the 6th month of her fourth term pregnancy This got worse during each succeeding term pregnancy Pain was worse on walking and was relieved on lying A tight binder round the pelvis relieved the pain to some extent Pain had got worse for last 1¼ year i e since last child-birth and radiated to the right leg It started suddenly on the 7th postpartum day when she felt something giving way on getting out off a jeep

On examination a small gap could be felt in the pubic symphysis and movements at the pubic symphysis could be demonstrated with one finger in the vagina while patient stood on one foot at a time

X-ray of the pelvis revealed separation of the pubic symphysis Haemoglobin was 10 5 gm % and serological tests for syphilis were negative She has been given a supporting jacket and is improving, possibly partly with lapse of time

Case No 3

Mrs S D 35 years P5 + 0 was first seen on 6th July, 1960 with the chief complaint

multipara and bony pains in a preceeding pregnancy led us astray Even though no typical changes of triradiate pelvis and beaking of pubis were seen, osteomalacia was being considered the first possibility After the X-ray and on reviewing the history, the case was found to be typical, with an evident gap, and mobility of the pubic bones and characteristic history of onset of pain suddenly on the 4th post-partum day Long bones were also X-rayed and did not show any evidence of osteomalacia (Fig 4) It appears this patient was



Fig 4
X-ray of long bones showing no evidence of Osteomalacia.

suffering from excessive relaxation of the pubic joint right from the fourth pregnancy onwards, but it is likely that rupture occurred during the 10th labour producing the symptoms during puerperium Boland has reported cases where the pain came on suddenly after labour when an attempt to walk was made It is possible the recovery occurred after rest but the lesion recurred with greater severity in succeeding pregnancy Patient was anaemic and generally run down and it is likely that her low health served as an aggravating factor Young has reported higher incidence of complications such as toxaemia, pyelitis and anaemia in 38 2% of his 34 cases and believes that poor health affects the muscle tone which normally protects the pelvic joints

No substantial explanation was found in case No 1 for the persistent high sedimentation rate and change in albumin and globulin ratio with raised globulins This indicates chronic infection, but none except mild sepsis in teeth was found Liver function tests were done only to find the cause for this change but they were within normal limits Later, when the general condition improved albumin/globulin ratio returned to normal Tubal ligation was done in case No 1 as patient was a grand multipara and it was felt that the further pregnancies will only help to increase her disability With contracted pelvis the difficulty in future labour was also expected Besides this she had an economic problem of rearing a large family and was only too anxious to be sterilized

In case No 2 the diagnosis was easier as now we are looking out for these cases Her history is also characteristic, suggestive of repeated trauma in the last 5 pregnancies with rupture of pubic symphysis occurring on the 7th post-partum day while getting out of a jeep In cases No 3, 4 & 5 the history of acute onset of pain with trivial trauma was also typical

TABLE II
Summary of Cases

S. No.	Date when first seen	Age in years	Occupation & parity	Onset: When	Onset: How	When first seen	Recurrence	Special investigations	Treatment General Plus
1 Sh D	1- 8-59	38	Housewife 11 + 0	After 10th delivery 4th post-partum day	On getting up	8 months after 11th delivery	Recurrence in 11th pregnancy Sterilized	Hb = 8 Gm% ESR — 40 mm Altered Albumin & globulin ratio	Best rest Pelvic Jacket Sterilization
2 Kh	26-10-59	35	Housewife 9 + 5	Seventh postpartum day	On getting out of Jeep	1½ year after the last delivery	Not yet pregnant again	Hb = 10.4 Gm%	Pelvic Jacket
3 S D	6- 7-60	35	Housewife 5 + 0	Fourth postpartum day	On getting up	1½ months after the last delivery	Not yet pregnant again	Hb = 11 Gm%	Pelvic Jacket
4 K S	1- 5-60	29	Nursing sister 1 + 0	At 37 weeks pregnancy	On getting out of bed	Seen in second pregnancy at 21 weeks	Recurrence	Hb = 12 Gm%	Pelvic Jacket
5 C K	30- 8-60	30	Farmer 3 + 0	36 weeks pregnancy	On running in the field	Seen in fourth pregnancy at 38 weeks	Recurrence	Hb = 11.5 Gm%	Bed Rest & Pelvic Jacket.

parae In 10, labour was normal, 1 breech, 2 mid-forceps and 3 patients gave a history of fall on side during pregnancy In his cases the symptoms came on from 2 months before delivery to 12 days after delivery All our patients had normal deliveries and initial symptoms came on, in 2 cases before delivery and in 3 cases after delivery In two cases of the present series, the symptoms first occurred in the first pregnancy In all those who conceived again, the symptoms recurred in the succeeding pregnancies Boland had similar experience of recurrence in the succeeding pregnancy

Diagnosis

Diagnosis is often difficult as displacement, though present, is often symmetrical and easily missed Correct diagnosis is made on good history, careful examination of pelvic joints, and radiological study of the pelvis Acute onset of pain in the pubic symphysis, marked tenderness, gaping and demonstrable rocking on knee or leg lifting are diagnostic Occasionally moderate gaping at the pubic symphysis is present without any symptoms However, there is no increased mobility in those cases Opinions as to the involvement of the sacroiliac joints differ widely Ahlefeld, Wishner and Mayer state that they must be involved in the true rupture of the symphysis pubis While Kayser Muellerheim, Von Fernwald and Engstroem state that such involvement of sacroiliac joint is not necessary It is logical to conclude that separation of pubic symphysis when marked with flaring of the innominate bones is likely to put the anterior sacroiliac ligaments on strain and result in their tear Sacroiliac involvement could also occur without the involvement of pubic symphysis, due to the backward rotation of sacrum, causing tear of the anterior sacroiliac ligament Localized pain over the joint, and pain radiating along the thigh are the important clinical features

Backache

Backache is a common postnatal symptom Goldthwait for long has drawn attention to the part played by the softening of the sacroiliac joint structures in the production of the backache of pregnancy The backache produced by this lesion has to be distinguished from orthopedic backaches Tuberculosis, arthritis, trauma have to be excluded Primary muscular spasm and altered spinal curvature may also produce backache but large majority are due to sacroiliac strain Dr Hannah Elder, at Antenatal department of Edinburgh Royal Maternity Hospital and Simpson Memorial Hospital, found backache in 3 7% in 3030 antenatal cases and majority occurred in 6th and 7th month when the weight of the uterus is not maximum Majority of these are likely to be due to sub luxation of sacroiliac joints

Treatment

Treatment is simple Bed rest and a light corset can usually tide the patient over Boland's belt may be more helpful for severe cases In these the condition is more likely to recur in succeeding pregnancies Occasionally open operation and fixation of joints is required It is important to look out for these cases, and may be many could be relieved who go about

Onset, Parity & Recurrence

The only large series reported so far are by Boland and Young Majority of Young's cases had combined sacroiliac and pubic lesions The symptoms are produced by excessive relaxation at the pelvic joints The relaxation starts early in pregnancy and is maximum about 2 months before term, usually there is no further separation during labour After delivery involution is complete in about 3-6 months time This relaxation is present in 98% of cases Degree of separation is same in multipara as in primipara Robert, who examined 40 non-pregnant and 104 pregnant women, has shown that there is no relation between the degree of separation, and the symptoms The symptoms are produced by the mobility at the joint (Young) These may come on at any time during pregnancy as in cases 4 & 5 and may be precipitated by a trivial trauma e g tying a shoe lace, as occurred in one of Young's case or even just getting out of bed as occurred in case 4 Rupture may occur during labour specially with a rapid second stage, due to the bursting force of the head on pubic symphysis and rotating strain on the sacroiliac joints, or it may occur during a difficult forceps extraction The symptoms come on immediately on coming round from an anaesthetic or during puerperium when patient makes an attempt to move In Sholtz's case it occurred on the 3rd post-partum day and in cases reported above in cases 1 and 3 it occurred on 4th post-partum day and in case 2 on 7th post-partum day Finkbeiner in 1948 gave the explanation that fissure and cavities appear in the fibro-cartilage of the symphysis pubic due to repeated trauma of successive pregnancies The wedge effect of the foetal head during quick descent may overstretch the ligaments to a point short of rupture which finally occurs during puerperium by somewhat abrupt movement The lesion does not respect any parity but is more common in multipara (Canton 1899, Bolland 1933) The maximum parity reported is 5th by Boland and 7th by Young, while case No 1 was an 11th gravida and case No 2, 14th gravida Two of Boland's cases were primiparae and 14 multi-



Fig 5
Case No 4 X-ray taken 3 days after the 2nd delivery shows separation of the pubic symphysis

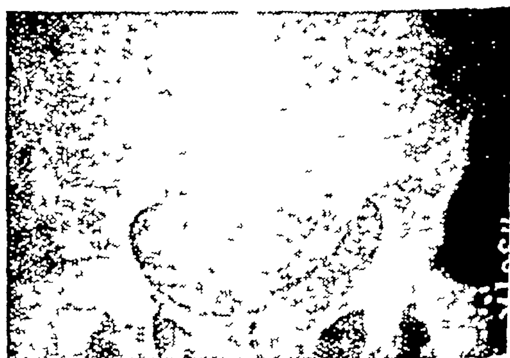


Fig 6
Case 5, X-ray taken 3 days before delivery shows slight separation of the pubic symphysis

getting all sorts of treatment, varying from vitamins pills, calcium injections, massage, to an advice to bear up the pain as a necessary accompaniment of pregnancy

Summary

1 Five cases of pelvic arthropathy of pregnancy are presented

2 Difficulties in diagnosing these cases are discussed and chronic sufference of the patient on account of missed diagnosis is stressed

3 Literature on the subject is reviewed

Acknowledgements

Our thanks are due to Dr P K Malkani, F R C O G Professor of Obstetrics and Gynaecology, All India Institute of Medical Sciences for reviewing this paper, to Dr R L Mehra, Medical Superintendent, All India Institute of Medical Sciences Hospital, for permission to report these cases and to Miss L G Ramchandani for secretarial assistance

References

1 Ahlfeld, B ad Schmidt's Jahrb 169 185, 1876
2 Barne's, J In Holland, E, and Bourne, A British Obstetrical and Gynaecological Practice, London 1955, William Heinman Medical Books Ltd
3 Bolland, B J Surg Gynec & Obst 57 517, 1933
4 Canton, L Relaxation of symphysis and pelvic arthralgia in pregnancy Thesis Paris, 1899 (Quoted by Boland[3])
5 Elder, H quoted by Young J [18]
6 Engstroem Mitt a d gynaek Klin d o Engstroem, 6 239, 1904
7 Fink-beiner, H Z Gebertsh Gynk 129 186, 1848
8 Goldthwait, J E, Osgood, R B Boston M & S J 152 1906
9 Kayser, F Arch f Gynaek 70 78, 1903
10 Muellerheim Samml Klin Vortr, N N F 91
11 Nemee, E Bratislavaske Lekarske listy V 629, 1926
12 Roberts, R E Proc Roy Soc Med 27 1217, 1934
13 Reis, Ralph A Baer Joseph L, Arens Robert A, and Stewart Ellans Surg Gynec & Obst 55 336, 1932
14 Schauta Allg Wien Ztschr, 42, 1882
15 Scholtz B M J 2 471, 1952
16 Von Fernwald, B Arch f Gynaek, 47 56, 1894
17 Wishner, J and Mayer, L Surg Gynec & Obst 49 380, 1929
18 Young, J J of Obst & Gynec of Brit Emp 47 493, 1940

Summary and Conclusions

1 An interesting case of pregnancy in rudimentary horn has been described

2 The rare finding of communication between the rudimentary horn and uterus has been observed

3 The possible mode of fertilization in this case has been commented upon

4 The reasons for intra-uterine death have been outlined

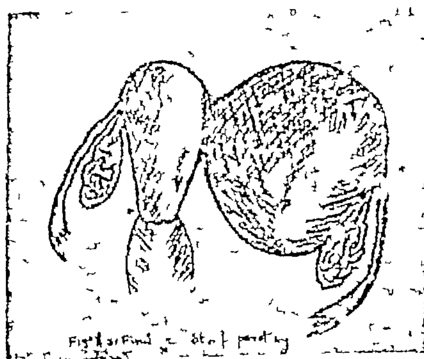
References

1 De Lee J B and Greenhill J P Principles and Practice of Obstetrics, Philadelphia, W B Saunders Co., *532, 1943*

2 Louden J D O Jour of Obst & Gyn., B E, 66, 277 1959

3 Muslow F W Amer Jour of Obst. & Gyn 49, 773, 1945

4 Stander H. J & Williams Obstetrics, New York, D Appleton Century Co *709 1941*



uterine death of foetus was made Plain X-ray abdomen was taken on 27-11-1959 Skiagram showed jumbled up foetal bones in pelvic region, Spaldings was positive Blood fibrinogen was reported to be 240 mgm, blood urea 34 mgm %, V D R L and Kahn's were negative Fundoscopy revealed nothing abnormal

On 27-11-1959, a pitocin drip was given after the method of Louden, but failed She was prepared for laparotomy and abdomen was opened on 1-12-1959 under general anaesthesia A mass was seen in the position of the uterus, rounded in shape On further exploration uterus was found lying posterior to this lump almost normal in size The above-mentioned mass was attached to the left side of uterus by a fibrous band about 3 cm in length Left-sided round ligament, fallopian tube and ovarian ligament were arising from the left lateral aspect of the mass The right tube, ovary and round ligament were normal in position (Fig 2)

Diagnosis of pregnancy in rudimentary horn was made Kocher's clamps were applied over the fibrous band on the medial side, fallopian tube ovarian ligament and round ligament on the lateral side, and the accessory horn was removed en mass On releasing the Kocher's forceps applied to fibrous band and probing, a communication was found between the rudimentary horn and the uterine cavity The round ligament, ovarian ligament and the tube were joined to the left cornua of the uterus The uterus was ventri-suspended by plication of round ligaments and abdomen closed in usual way

Patient had a smooth convalescence and was discharged from hospital on 13-12-1959

On opening the rudimentary horn a macerated female foetus was found lying crumbled up along with the cord and placenta There was no sign of internal haemorrhage Placenta was shrunken and autolysed, myometrium was thick, decidua was being cast off

Comments

The uterus is the product of fusion of the two Mullerian ducts Failure of fusion due to one reason or the other results in congenital anomalies the nature of which depends upon the time when such a disturbance occurs in the orderly growth of the foetus Unilateral fault in the development of Mullerian ducts following lack of fusion explains the origin of the rudimentary horn of uterus Bicornis Unicollis

It has been observed that in about 90 per cent of the cases of pregnancy in rudimentary horn, rupture occurs about the 4th or 5th month This may prove fatal due to intraperitoneal haemorrhage The remaining 10 per cent proceed further and may go to term and usually cause trouble by death of the foetus at various periods

It is interesting to note that in the case under reference the rudimentary horn was connected to the uterus by a fine tunnel It appears that pregnancy occurred by spermatozoa travelling from the cavity of the uterus to the horn through the communication described above, though this route is very uncommon

The pregnancy possibly was undisturbed till the 5th month when the foetus died, the cause of foetal death could be either defective decidual formation but more probably abnormal placentation, reduced placental circulation and hypoxia resulting in intrauterine death of foetus There was no evidence of intra-uterine haemorrhage It is interesting to observe that the horn escaped rupture, which is so common at about 5th month Equally interesting is the fact that the foetus died intrauterine and did not go near term, and perish then, which is the common mode of termination

(3) A fine catheter was passed through the abdominal opening into the uterus and lipiodol was injected through it The fistulous tract uterus and the upper vagina could be visualised (Fig 1)

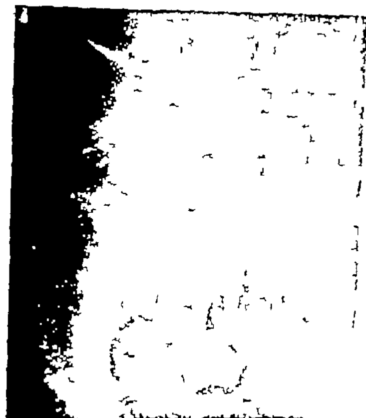


Fig 1
Skiagram after instillation of lipiddol showing the uteropareital fistula (with a catheter in situ) and outline of the uterus

Bleeding through the fistula persisted for 10 days. A week after it ceased excision of the fistulous tract was decided upon

Operation Notes. An elliptical incision enclosing the previous scar and the fistula was made The tract was found leading into the uterus which was adherent to the anterior abdominal wall The bladder too was pulled up and found adherent to the opened uterine cavity The uterus was freed from its adhesions to bladder and omentum The fistulous tract along with unhealthy edge of the classical caesarean scar in the uterus was excised together with the nylon sutures which were still persisting The fresh edges of the uterine wound were then approximated in layers with interrupted No 1 chromic catgut The tubes showed evidence of sterilisation operation done previously The abdominal wall was then repaired carefully

The post-operative period was smooth and the abdominal wound healed well

Pathological report on the fistulous tract

Only granulation tissue seen There is no evidence of endometrosis Subsequent to the operation her periods have been normal

Case 2

MENSTRUAL FISTULAE FOLLOWING CAESAREAN SECTION

by

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Obstetric complications after caesarean section are well known. Rarely, gynaecological and urologic conditions are seen following this operation. Amongst these may be mentioned relative sterility, scar endometriosis (Nara et al, 1956, Martins 1959), uteroparietal fistulae, vesical fistulae and recurrent bladder calculi (Rao, 1957). Menstrual diversion following abdominal delivery is an interesting but rare phenomenon.

Case 1

Mrs. M. 20 years old, was admitted on 28-1-1958 with a history of periodic bleeding through an abdominal opening since her last delivery 8 months earlier. Till then her periods used to be regular and painless. Even after the delivery she had 2 normal periods after which she noticed a painful swelling about the middle of the abdominal scar. As it failed to respond to antibiotics it was incised and blood-stained fluid and a few nylon sutures were let out. Since then she has been getting her periods mostly through this abdominal sinus. The periods now last longer [illegible] 10 days but the vaginal bleeding is very slight and that too on first two days only. At the time of admission she was in the second day of her period.

Obstetric History. Her first delivery was by classical caesarean section for transverse lie in 1955. In April 1957 classical caesarean with sterilisation was performed for recurrence of transverse lie. She had fever for the first 5 days of the operation. The wound had healed by the tenth day, but, as stated earlier, after lapse of three months she developed a painful swelling which required incision and drainage.

On Examination. She was slightly anaemic. Heart and lungs were normal.

Abdominal examination showed a median subumbilical scar with a small opening in it, about 6 cms. above the symphysis pubis discharging dark blood. This opening was surrounded by induration and a globular intra-abdominal swelling, about 8 cms. diameter, was felt closely adherent to the scar in the region of the cutaneous opening. A probe could be passed to a depth of 3.5 cms. through this fistula. Vaginal examination showed the cervix to be normal and closed, uterus was anteverted, normal in size but was pulled up and fixed to the abdominal wall. Slight blood-stained discharge was present on examining finger.

A provisional diagnosis of utero-parietal fistula was made and the following investigations were done.

(1) Methylene blue solution was injected into the cervix. It came out immediately through the abdominal fistula.

(2) Uterine sound passed through the cervix could be felt by means of a probe introduced simultaneously through the abdominal opening.

of fistula In all the cases reported so far, this complication followed lower segment caesarean except in a case reported by Ingleman Sundberg (1948) where it resulted from vaginal caesarean section In our case, however, classical caesarean section was the cause

The reason why in the presence of a patent cervix, menstruation should be diverted via the fistula into the bladder and yet prevent urinary leakage was not obvious till recently Laffont and Ezes thought that a valve like mechanism prevented escape of urine via the cervix But Youssef (1957) who coined the term menouria for this kind of vesical menstruation gives a fairly convincing explanation According to him, normally the menstrual fluid first gets collected in the uterus giving rise to uterine contractions which open the sphincter at the internal os to let out the menstrual blood through the cervix If however, a fistula is present above the level of this sphincter, no menstrual fluid accumulates in utero as it can easily find its way into the bladder In all cases of menouria, the fistula is situated above the level of internal os If it is located below this level there will be only urinary incontinence but no menstrual diversion It is extremely rare for any one to make a lower segment transverse incision so high (above the level of internal os) and yet injure the bladder This may account for the rarity of this type of fistula On the other hand, a lower segment vertical incision or classical section wound may extend low down to involve the bladder Fortunately the practice of making vertical lower segment incision has been given up in most clinics During a lower segment operation, by reflecting the bladder well and carefully protecting it during incision as well as repair of the uterus, this complication can be prevented Probably, the paucity of classical type of caesarean sections, the use of chromic catgut to close the wound in layers and the control of post-operative infection with antibiotics have reduced the incidence of uteroparietal fistulae

The symptoms in endometriosis of the scar and vesical endometriosis may very closely resemble those noted in the two varieties of menstrual fistulae described here In scar endometriosis there is no demonstrable fistulous communication and evidence of endometrial spread to abdominal skin could be confirmed only by histologic examination after resection of the involved scar and adjacent tissues In endometriosis of the bladder there is pain accompanying cyclic haematuria and cystoscopy will be of valuable diagnostic aid

The treatment consists of restoring the menstrual pathway to normal In uteroparietal fistula the whole fistulous tract has to be excised, the uterine opening repaired and finally the abdominal wall should be closed in layers If however, in view of her age, parity or associated lesions it is not necessary to conserve the uterus hysterectomy along with fistulectomy is done In tuboparietal fistula the tube is mostly damaged and requires removal In cases of menouria every patient may not agree to surgical restoration of the defect In fact our patient felt vesical menstruation 'more convenient and more sanitary than the normal one In this type of



Fig 2
Urinary deposits from a case of menouria showing endometrial stroma, glands and red blood cells (H E x 56)

cervical fistula was made But she refused operative treatment and was discharged 15 days later

Discussion

Complete or partial diversion of menstrual fluid may be produced when abnormal channels are established between the uterus and abdominal wall or any adjacent viscus which communicates with the outside The degree of such a diversion depends on the size and location of the tract in relation to the uterus and whether the natural passage for menstrual discharge is patent or not The first case of utero-parietal fistula was reported by Bircher (1910) and it followed ventrifixation of the uterus In 1951 Poddar reviewed 36 cases of utero-cutaneous fistulae published by different authors and pointed out that in 95 per cent of such cases the complication followed classical caesarean section and in almost all cases it was either due to post-operative infection or use of unabsorbable sutures

Case (1958) has reported such a fistula following myomectomy and ventrifixation Recently, Kirkland (1959) collected 100 cases of abdominal menstrual fistulae from the literature but found that only in 33 sufficient data were available for analysis In 15 cases there was preceding history of pelvic inflammation involving removal of the tube and in the remainder it followed classical caesarean section In the former group of patients, the menstrual diversion occurred indirectly via the tubal stump or its fimbrial end which was adherent to the anterior abdominal wall In the case reported by us, the nylon sutures used for closure of the caesarean incision and slight postoperative infection along with the delayed wound sepsis favoured the establishment of this abnormal menstrual pathway In all these cases the uterus is attached to anterior abdominal wall and the opening in the uterus may be small (in cases following ventrifixation) or large as in our case where almost the whole caesarean scar had yielded

Menstrual diversion via the bladder is comparatively rare Laffont and Ezes (1947) were the first to report this interesting abnormality following lower segment caesarean section Falk and Tancer (1956) reported 9 cases (including 3 of their own) of vesical fistulae following caesarean section In 5 of these they found amenorrhoea of 3 to 8 months' duration following surgery before the c_ 'ic haematuria was established They pointed out that urinary incontinence is extremely rare in this type

ANGIOMYOMA OF UTERUS

by

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Vascular tumours of the uterus are rare and this rarity is in sharp contrast to the rich vascularity of the organ, specially during the menstrual cycle and pregnancy Because of the multiplicity of names used to describe an identical tumour and identical terms signifying various pathologic processes, it is difficult to determine exactly the number of genuine cases of angiomyoma amongst the reported cases of vascular tumours The difficulty is accentuated because of the frequent lack of complete pathological and histological data and failure to distinguish between the true cavernous haemangioma of the uterine wall without leiomyoma and angiomyoma of the uterus

Less than fifty cases of angioleiomyoma have been reported in the literature The description in 1867 by Virchow has been accepted as probably the earliest recognition of the existence of this lesion, although too few data were recorded to allow it to be evaluated and classified properly Robert Meyer characterized the uterine vascular tumours as independent tumours of the blood vessels He distinguished between the pure tumours of the uterine wall itself and the angiomas encapsulated in the myomas He regarded the latter as mixed tumours consisting of angiomatous growth mingled with myomatous, fibromatous or sarcomatous structures Pedowitz, Felmus and Grayzel (1955) reviewed the literature concerning vascular tumours of the uterus and reported 46 of angiomyoma cases out of 138 cases of vascular tumours of the uterus. Hesche-Klunder and Kammerer (1956) and Hellweg (1956) have added case reports of the tumour subsequently

Except for three cases of haemangiomatous fibromyomata reported by Gupta in 1931 there is complete lack of case reports of angiomyoma of uterus from India This rarity of the tumour necessitates the report of this case of angiomyoma of the uterine wall

Clinical Features

D K. a 40 year old married Hindu female was admitted to the Gynaecological Wards of Sarojini Naidu Hospital Agra in January 1959, complaining of profuse menstruation and intermenstrual bleeding accompanied with lower abdominal pain for two years. She first observed increase in flow of menstrual bleeding The flow gradually increased in quantity and duration Later she noted dull dragging lower abdominal pain which had been progressive

vesico-cervical fistula, vaginal repair is not possible and transperitoneal approach is the best The bladder is pushed well down from the cervix and the openings in both these organs are repaired carefully before the bladder peritoneum is sutured back to the uterus If the uterus be diseased, a hysterectomy is done and the defect in the bladder is repaired simultaneously

Summary

1 Two cases of menstrual diversion, one due to uteroparietal fistula and another due to vesico-cervical fistula, have been described Both cases followed classical caesarean section

2 The etiology and management of menstrual fistulae following caesarean section has been briefly discussed

Acknowledgment

I must thank Dr P T Madhaviamma, M D M R C P, for permitting me to report the second case

References

1 Bircher Quoted by Poddar D J Obst Gyn India, 2, 108, 1951
2 Case T C Obst & Gyn, 12, 233, 1958
3 Falk H C and Tancer M L Amer J Obst Gyn, 71, 97, 1956
4 Ingleman-Sundberg A Gynaecologia, 126, 275, 1948
5 Kirkland J A Amer J Obst Gyn, 78, 1292, 1959
6 Laffront A and Ezes H Gynec et Obst, 46, 248, 1947
7 Martins S M J Obst. Gyn Brit Emp, 66, 525, 1959
8 Nora E, Meyer K A, and Carbonera P Amer J Obst Gyn, 71, 876, 1956
9 Poddar D J Obst Gyn India, 2, 108, 1951
10 Rao U M Ind J Surgery, 19, 123, 1957
11 Youssef A F Amer J Obst Gyn, 73, 759, 1957



Fig 3
Angiomyoma—showing presence of both old and newly formed proliferating capillaries (H & E. x 430)

muscle of the media was present at places Elastic fibres could be demonstrated in the walls of bigger vessels by special staining procedures Many of the vessels were filled with blood. The mesenchymal connective tissue was composed of branching cells and in many places showed a structure of more or less numerous collagenous fibrils Undifferentiated mononuclear cells and lymphocytes in addition to small amount of fibro-elastic t ssue were seen in between the vascular channels. The myometrium consisted of nonstriped elongated muscular fibres arranged in bundles and cut longitudinally and transversely Irregular areas of degeneration were seen specially in the vicinity of blood vessels Cervix and both fallopian tubes showed evidence of chronic inflammation Right ovary revealed the presence of a simple serous cyst while the left ovary was negative

Discussion

Angiomyoma of the uterus has only rarely been reported in the literature Very little is known regarding the true incidence of these tumours The diagnosis of angioleiomyoma is mainly a histologic one It is difficult to draw the line sharply between angiomyoma and leiomyoma with dilated and tortuous vessels Kelly and Cullen drew attention to the similarity between the two forms and stated that the blood supply of a leiomyoma may be so conspicuous that the tumour in reality becomes an angiomyoma The great variations, possible in the intrinsic vessels of uterine leiomyomas, are clearly demonstrated by Sampson's observations on injected uteri The vascularity of myoma was found to differ markedly from that of the myometrium Most of these were found to be a mass of proliferating arteries and contained few or no veins within their substance The development of large number of blood vessels filled with the arterial injection mass was demonstrated in a few specimens giving an appearance of angioma rather than a myoma But unfortunately his reports did not include microscopic descriptions or photomicrographs of those cases hence exclusion of vascular tumours is not possible

MacCallum distinguished a true vascular tumour from dilatation of capillaries or venules belonging to the general circulation by the fact that the blood channels of the tumours grow independently without regard to the laws which govern the distribution of such vessels, forming thereby a mass which is somewhat drawn from the general circulation, and, although supplied with artery and vein, does not stand in any intimate anastomatic relations with adjacent circulation Microscopically, a vascular tumour can be distinguished from highly vascular leiomyoma by the presence of both old and newly proliferating capillaries within the neoplasm Angiomyoma can be differentiated from true cavernous

Physical examination revealed a fairly developed and well nourished middle-aged female, who looked pale The temperature was 97 8°F, pulse 84 per minute, respiration 20 per minute and blood pressure 106/78 mm Hg The general physical examination was essentially normal except for pallor The heart and lungs were normal The abdomen moved freely with resp ration No tenderness nor rigidity was felt An intra-abdominal lump could be felt in the midline just above the pubic symphysis Pelvic examination gave an impress on of fulness on the left side

A clinical diagnosis of fibroid uterus (? malignant) was made and an operation of total hysterectomy with bilateral salpingo-oophorectomy was performed At laparotomy the uterus was found to be uniformly enlarged to the size of 10 weeks' gestation The patient's post-operative course was uneventful

Pathology

Gross The uterus measured 14 5 x 8 5 x 7 5 cms The external surface was greyish white and smooth The myometrial thickness varied from 1 2 to 6 5 cms The cut surface through the myometrium was greyish white and homogenous The endometrium was 1-2 mm thick The uterine cavity showed a pedunculated irregular lobulated growth attached to left posterolateral wall of the uterus, as seen in Fig 1 It measured 11 5 x 7 5 x 3 8 cms and was firm in consistency The external surface was reddish brown in colour The cut surface was dark brown The cervix measured 3 0 x 2 8 x 2 5 cms The lips of the cervix were greyish white and smooth. The right fallopian tube measured 10 5 cms in length and varied in diameter from 4 to 6 mm External surface was greyish white and smooth Cut surface revealed a patent lumen The right ovary measured 4 2 x 2 4 x 0 8 cms External surface was greyish white and cystic Cut surface showed a cyst measuring 2 0 cms in diameter and containing watery fluid The left tube measured 8 cms in length and the diameter varied from 5 to 9 mm The external surface was greyish white and smooth The cut surface revealed a patent lumen The left ovary measured 4 5 x 2 8 x 0 5 cms Cut surface was greyish white and homogenous



Fig 1
Angiomyoma of uterus Gross photograph

Microscopic Histologically, the tumour revealed myometrium, showing the smooth muscle bundles containing large number of blood vessels of varying sizes as seen in Fig 2 The blood vessels varied in size from capillary to large sinusoidal proportions Thin-walled capillaries were lined with flat endothelial cells The bigger vessels showed endothelial lining and thick, circular, smooth muscle fibres surrounding the former Few areas showed the presence of both old and newly formed proliferating capillaries as seen in Fig 3 Hyaline degeneration of the smooth



Fig 2
Angiomyoma of Uterus Showing the smooth muscle containing large number of blood-vessels of varying sizes (H & E x 50)

2 Gupta N Ind Med. Gaz , 66, 371 1931
3 Hasche-Klunder R. and Kammerer H P Ztsch Urol., 49, 432, 1956
4 Hellweg G Geburtsch U Frau enh, 16, 233, 1956
5 *Kelly* H A and *Cullen* T S Myomata of Uterus W B Saunders Co , Philadelphia *1909*
6 MacCallum W G A Text Book of Pathology W B Saunders Co Philadelphia, 1924
7 Meyer R. Veit Stockel Handbuch der Gynakalogie J F Bergman Munich, Vol. 6 part 1, 1930
8 Pedowitz P , Felmus L. B and Grayzel D M. Amer J Obst. & Gyn., 69 1291, 1955
9 Sampson J A. Surg Gynec Obst. 14, 215, 1912 and 16, 144, 1913
10 Virchow R. Die Krankhaften Geschwerelste, A Hirschwald Berlin Vol 3, 1863-1867

haemangioma by the presence of circumscribed areas of greatly enlarged vessels occurring only within the smooth muscle tumours

The clinical diagnosis of angiomyoma is not possible as there are no characteristic signs or symptoms The clinical features of these tumours are similar to those produced by other similar pathologic changes in the uterus The symptoms which appear are secondary to the size and location of the tumours within the uterus The main complaint of the patient under discussion was increased bleeding per vaginam with abdominal pain No satisfactory explanation has been put forward to explain the cause of pain in these tumours Duhig and Ayer were unable to demonstrate large number of nerve fibres in cutaneous leiomyomas The most likely explanation, according to these workers, appeared to lie in contraction of the tumour vessels producing ischaemia within the muscle mass Histologically this is manifested in the form of degenerative changes within the neoplasm

The age at which angiomyomas of the uterus have their onset cannot be determined, but most of the tumours reported in the literature belong to fourth and fifth decades of life, that is chiefly to the late reproductive period and the decade following it Though most cases have occurred in parous women the tumour has also been observed in nulliparae, thus disproving the belief of early investigators that the tumours occurred only in previously gravid women and that somehow these were related to changes at the placental site

Whether angiomyomas are vascular tumours or vascular malformations is still disputed by some workers The particular age distribution of the tumour does not lend support to the theory of congenital deformity, as the symptoms are expected to arise more likely in the earlier decades rather than in later years Duhig and Ayer implicated the role of mechanical factors and oestrogen levels in the tissues and put forward the hypothesis that some vascular leiomyomas may in fact be malformations and not neoplasm in the true sense of the term Gupta correlated the presence of the tumours with epidemic dropsy because of the similarity in vascular channels But most of the workers are of the opinion that the neoplasm arises from embryonic mesodermal elements within the wall of the uterus

Summary

The literature on angiomyoma of uterus has been reviewed Angiomyoma of the uterus is a rare tumour Not more than 50 cases of the tumour have been reported in the literature One more case of angiomyoma of uterus has been added The patient presented the symptoms of menorrhagia associated with lower abdominal pain She was subjected to abdominal hysterectomy with bilateral salpingo-oophorectomy Histologic examination of the operated tissue revealed an angiomyoma of the uterus with chronic cervicitis and bilateral chronic salpingitis Important theories explaining the pathogenesis of the tumour have been discussed

References

1 Duhig J T and Ayer J P Arch Path 68, 421 1959

Gross appearance of the tumour A tense cystic tumour about the size of a small cocoanut On section the tumour was found to be multilocular containing straw coloured slimy fluid Although most of the cysts were thin walled a part of a cyst had rather thickened wall No hair nor any other ectodermal element recognisable by the naked eye could be found Section from the thickened area formed the relevant part of the tumour

Microscopic Examination. Sections from the different parts of the tumour showed cysts lined by the typical tall columnar cells with basal nuclei (Fig 1) The section from the thickened area of the tumour showed the cyst being lined by similar epithelium which gradually merged into stratified squamous epithelium over the raised area (Fig 2) The typical prickle cells with intercellular bridges from this part are well seen in Fig 3 This definitely proves that the epithelium at that area is typical squamous one and not mere pseudostratification or true stratification of columnar epithelium which is sometimes found in these tumours (Reagan 1949)



Fig 2
Section from the thickened part of the cyst showing the gradual transition of the columnar epithelium into stratified squamous epithelium on the left.
Haematoxylin & Eosin x 60



Fig 3
High power view of the squamous epithelium from the Fig 2 showing clearly the intercellular bridges x 480

Discussion

The typical tall columnar cells with basal nuclei lining these cysts have always been an enigma to the histologists, for such cells are not found in the ovary under normal circumstances Various theories have been proposed to explain their mode of origin in these tumours Goodall (1919) believed them to arise from the epithelium of a simple cyst or follicular cysts Others, like Gardiner (1932), Reagan (1949) and others supported this view But the appearances of these cells are so different from those lining the follicles



Fig 1
Section from the wall of a cyst showing the regularly arranged tall columnar cells with deep staining basal nuclei and clear refractile cytoplasm on the top
Haematoxylin & Eosin x 480

AN UNUSUAL CASE OF PSEUDOMUCINOUS CYSTADENOMA

by

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Although pseudomucinous cystadenoma is not an uncommon tumour of the ovary, the histogenesis of this interesting tumour is as yet unsettled The chance observations of a tumour with certain features, which, in our opinion, are likely to throw some light on this problem, has prompted us to publish this case report

Case Report

A N , a Hindu female, aged 18 years, was admitted into Nilratan Sircar Medical College Hospital with the complaints of — (i) gradually increasing swelling of the lower abdomen for 4 months, and (ii) occasional pain in the abdomen for 4 months

Obstetrical History One normal full-term delivery with domiciliary confinement

Menstrual History Regular, duration of 4 days with a cycle of 28 days, and normal flow Menarche started at the age of 12 years L M P — lactational amenorrhoea since the last child-birth On enquiry, it was found that she did not notice any swelling prior to the birth of the child The labour was normal During the puerperium she detected a lower abdominal swelling but otherwise the puerperium was uneventful Since the birth of the child the lower abdominal swelling gradually increased in size Associated with this she had pain over the lower abdomen off and on, which had no relation to bowel or bladder action Neither was there any history of acute pain necessitating medical intervention

Examination Build and nutrition were fair Examination of the cardiovascular, respiratory and nervous systems did not reveal any abnormality On abdominal examination, a midline globular cystic mass extending up to the umbilicus was detected On vaginal examination, the uterus was separate from the mass, uterus was of normal size and consistency, freely mobile and was retroverted The cervix did not move with the lateral movement of the abdominal mass Skiagram of the abdomen did not show any x-ray opaque shadow

She was operated on 2-4-60 Abdomen was opened by a right paramedian incision An ovarian cyst was detected on the right side No other abnormality was detected in the other pelvic organs She had oestrogen for the suppression of lactation and the postoperative recovery was uneventful The stitches were removed on the 6th day and she was discharged from the hospital on the 7th day after operation She visited the hospital 6 weeks after her discharge from hospital and on examination, everything was found satisfactory

INCIDENCE OF TRICHOMONAS VAGINALIS VAGINITIS DURING PREGNANCY AND ITS TREATMENT WITH S V C

by

VINOD G DAFTARY, N D MOTASHAW, AJIT C MEHTA and J RAMI

Nowrosjee Wadia Maternity Hospital Bombay-12

Trichomonas vaginalis vaginitis forms a comparatively minor but important problem of obstetrician's practice and much work has been done on the subject during past few years Many authors (Ian Donald 1952, Shah S R. 1958, Plent et al 1956) report highest incidence during child-bearing period when ovarian activity is at its prime and vagina with respect to pH and squamous epithelium is more resistant to infection in general than at any other time Pregnancy may render patient more liable to infection or activate the infection which may be already existing Clinically, trials with antibiotics and other drugs have been reported in literature (Donald 1952, Shah 1958, Greenblatt and Barfield 1951, Shaw et al 1952, Lang et al 1953 Gaiduer and Dokes 1956, Brentand and Moricard 1952) Many of these drugs and almost all the antibiotics tried were effective but considerable incidence of recurrence has been reported and permanent cure was not possible

We have here reported incidence of trichomonas vaginalis vaginitis during pregnancy in 252 cases and treatment with S V C in proven cases

Material and Method

The patients were pregnant women who attended the antenatal clinic of N Wadia Maternity Hospital, Bombay 12

As we wished to study the incidence of trichomonas infection during pregnancy as such, patients were taken at random without considering whether they were symptomatic or not. The selected patients were specifically asked for the following complaints

(i) Leucorrhoea—its degree and smell (ii) Pruritus (iii) Burning micturition (iv) Erythema and swelling of vulva (v) Ulceration of skin

A speculum examination was then carried out to examine the vagina and cervix and to collect the discharge with a sterile applicator discharge was taken from the region of the fornices and smear for Gram's staining was made Discharge collected with the speculum was suspended in saline for wet preparation which was examined under microscope for trichomonas vaginalis, associated monilial infection and bac

TABLE 1

No of cases examined	Cases + ve for trichomonas	Cases — ve for trichomonas	Incidence
252	60	192	23 8 %

that it is difficult to accept such simple explanation

The most widely supported view is that of Bland-Sutton (1927), Schiller (1940) and others who considered these *tumours to be teratomas*, i e teratomas with the development of intestinal type of epithelium only, the other elements being blighted out This view was based not only on the similarity in appearance between these cells and the columnar epithelium of the intestines but also on the fact that pseudomyxoma peritonii can occur from the spilling of cells from appendicular mucocele and look exactly like those arising out of ovarian pseudomucinous cystadenomas This similarity in appearance has been taken as a proof that this epithelium represents the intestinal type of epithelium in an ovarian teratoma

The demonstration by us of the transition of these epithelial cells into stratified squamous cells proves the multipotential nature of these cells and this fact, we believe, gives a conclusive proof of the teratomatous origin of such tumours, i e teratomas where the intestinal type of epithelium predominated, the other elements being blighted out It is possible that careful search of other pseudomucinous cystadenomas may reveal the presence of such heterogenous histological elements in part of the tumour This might clinch the issue in favour of this view

Since pseudomucinous cystadenoma may sometimes be found in association with Brenner's tumour, it has been suggested to be a variant of Brenner's tumour (Novak and Jones, 1939) But the association may be fortuitous Little credence can be put to other suggestion of histo*genesis of these tumours, i e they* arise from rete ovari (Herbut, 1953)

Summary

A case of pseudomucinous cystadenoma is presented which showed a transition of the typical prickle cells into stratified squamous epithelium The histogenesis of such tumours is discussed on the basis of such observation

Acknowledgment

We wish to thank Principal R N Guha Mazumdar M B, B Sc, F R C S, F R F P S for kindly permitting us to use hospital records

References

1 Bland-Sutton J Lancet, 2, 741, 1927
2 Gardiner W S Amer J Obst & Gyn, 23, 54, 1932
3 Goodall J R Proc Roy Soc Med, 13, 63, 1919
4 Herbut P A Gynecological and Obstretical Pathology Lea & Febiger, Philadelphia, 1953
5 Novak E and Jones H W Amer J Obs & Surg, 38, 872, 1939
6 Reagan J W Amer J Path, 25, 689, 1949
7 Schiller W Sur Gyn & Obs, 70, 773, 1940

survived in presence of Doederlein bacilli In our case trichomonas vaginalis was associated with Doederlein bacilli in 28 cases and with candida in 23 cases pH of the discharge in which trichomonas were found, was between 4 and 6

Symptomatology Leucorrhoea was the commonest of complaints in patients with trichomonas vaginitis and out of 60 positive cases 47 complained of mild to severe leucorrhoea Discharge varied from scanty thin white to profuse, thick, yellowish white, frothy and foul smelling Thick curdy or mucoid discharge was noted in some of the cases Another common complaint was itching and burning micturition Erythema and ulceration, however, were present in very few of the cases

Associated Pathology On examination, in nearly half of the cases vagina was red and inflamed, associated with red and inflamed cervix In cases where severe itching was complained of external genitals showed marks of scratching

Treatment We treated the patients with S V C (acetarsol vaginal compound) an arsenical preparation Use of arsenic in the treatment of trichomonas vaginalis vaginitis was described as early as 1933 by Gellhorn and highly recommended by Miezes (1957) No toxic effects were reported and discharge was reduced after second or third treatment Though S V C is not as effective as antibiotics, it is cheap and comparatively effective, and even where therapy fails, symptomatic relief is obtained

As most of our patients came from the lower income group, they could also afford S V C for their treatment

Patients were instructed to insert one tablet of S V C every morning and evening for 15 days, and to report for follow-up after 4-7 days of completion of therapy They were also instructed that during the course of treatment they should (i) wear washed underlinen and change it daily, (ii) abstain from sexual intercourse, and (iii) abstain from douching

All the examined patients were asked to report after 2 days and were treated, if found infected Out of 60 positive cases, only 46 turned up for their treatment They were given S V C tablets and were asked to report after 15 days Out of 46 patients thus treated, 15 turned up for their second speculum examination and follow-up The rest might not have come due to symptomatic relief obtained by the treatment

Thus, out of 15 patients treated 11 were negative for trichomonas vaginalis after one course of treatment and 2 after 2 courses In one case trichomonas infection was lessened after 2 courses but not completely eradicated One case did not turn up

TABLE 4

No of cases treated with S V C	Wet preparation —ve for trichomonas after 1st course	Wet preparation —ve for trichomonas after 2nd course	Wet preparation +ve for trichomonas after 2 courses	Patients who did not turn up after 2 courses	Cure rate
15 (100%)	11 (73.3%)	2 (13.3%)	1 (6.6%)	1 (6.6%)	[illegible]

TABLE 2

Total No. of +ve cases	Symptomatic	Asymptomatic
60 (100 %)	43 (71 %)	17 (29 %)

terial contamination. Smear with Gram's staining was examined to note general bacterial flora.

Out of 43 symptomatic and 16 asymptomatic cases 17 and 6 cases were respectively associated with monilial infection.

Symptomatology

TABLE III

Symptoms	No. of cases
Leucorrhoea	47
Pruritus	26
Erythema	5
Ulceration	1
Burning micturition	17

Discussion

Incidence of trichomonas vaginalis in pregnant and non-pregnant women is reported by several workers.

Name of workers	Year	No. of cases studied		Incidence in pregnant women	Incidence in non-pregnant women
		Pregnant	Non-pregnant		
Shah	1958	50	350	8%	27%
Plenty et al	1956	214	818	20%	31.6%
Davis & Grand	1952	—	538	—	3.72%
Feo	1953	500 (negro)	—	43.6%	—
		200 (whites)		16.5%	
Hypes & Ladewig	1953	—	1000	—	19%
Bedoya et al	1955	—	1594	—	20%
M. K. K. Menon	1959	102	100	18%	17%
Present study	1961	256	—	23.8%	—

Some authors report higher incidence during pregnancy while others report higher incidence during non-pregnant state. But all the authors agree that incidence of trichomonas vaginalis is highest during child-bearing period, i.e. between 20-40 years of age. Incidence in our cases is lower than that reported by Feo (1953) in negro pregnant women. Comparatively higher incidence might be due to the fact that majority of our patients belonged to low income group where hygienic conditions are poor and body resistance lowered due to malnutrition.

Incidence and Parity: Higher incidence was noted in multipara than in primipara (Shah 1958, Donald 1952). Out of 60 positive cases, 15 were primiparae and 45 multiparae, thus giving the ratio of 1 : 3.

Incidence of Trimester: In literature (Feo 1953) highest incidence has been reported in last trimester of pregnancy. In our study, incidence in second and third trimester was the same (27 cases each) while that in first trimester was 5 cases only. We think that this may be partly due to the fact that the patients usually do not come for consultation to the hospital during the first trimester of pregnancy.

Associated Organisms: Feo (1953) observed that trichomonas vaginalis

9 Hypes and Hadwig Am J Clin Path , 26, 94, 1956

10 Kistner R. W and Duncan C J Obst. Gyn , 4, 155, 1954

11 Lang W R et al Obst & Gyn 2 527, 1953

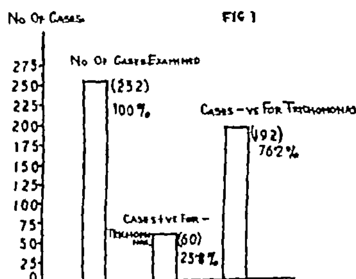
12. Menon M K. K Paper read at Symposium on Fungus Diseases in India at Calcutta Feb 1959

13 Miez et al Progress in Gyn , Vol III 1957

14 Plentl A. A. et al Am J Obst. Gyn , 71, 116 1956

15 Shah S R. J Obst. Gyn of India 9 129, 1958

16 Shaw H N et al Am J Obst. Gyn 71 116 1956



for follow-up after two courses Cure rate was 93% Our cure rate of 93% is comparable with that of 58% to 98% reported in literature with antibiotics and drugs such as Nystatin (Shah 1958), Aureomycin (Greenblatt and Barfield 1951), Vagisol (Shaw et al 1952), Terramycin (Lang et al 1953, Kistner and Duncan 1954), Tritheon (Gardner and Duker 1956), Estrogen (Brentand and Moricard 1950), etc

Out of 15 cases treated there was complete symptomatic relief in 6 cases, while 6 had slight relief and 3 had no relief at all Out of 9 cases who had slight or no symptomatic relief, 6 cases were also positive for moniliasis, and the symptoms might be due to associated monilial infection

Toxicity and Recurrence We did not notice any toxic effect following the treatment with S V C High incidence of recurrence is always noted in cases of trichomonas infection We could not follow up the patient for a sufficiently long period and so could not note the rate of recurrence after treatment with S V C Slight or no response and recurrence might be explained by the facts that (i) parasites might be harboured in Skene's or Bartholin's gland or in lower urinary tract, and (ii) male partners might be responsible for reinfection

Summary

(1) 252 pregnant women were examined at the antenatal clinic of N Wadia Maternity Hospital, Bombay, for incidence of trichomonas vaginalis vaginitis and 60 were positive giving incidence of 23 8%

(2) Out of 60 positive cases, 46 turned up for treatment and were treated with S V C two tablets daily by vaginal route for 15 days

(3) Out of 46 cases treated, 15 turned up for second speculum examination 11 were negative for trichomonas Out of 4 positive cases, 2 were negative after second course of treatment, 1 had slight improvement and 1 did not turn up for examination Cure rate with S V C was thus 93% This is comparable with cure rate with other drugs and antibiotics

Acknowledgments

We are thankful to Dr K M Masani, M D (Lond), F R C S (Eng), F I C S , Hon P M O , for the permission given to us to carry out the investigations We are also thankful to Resident Medical and Nursing Staff of N Wadia Maternity Hospital for their help during the investigation Thanks are also due to, Messrs May & Baker for liberal supplies of S V C tablets

References

1 Bedoya J M , Rico L R and Rios G Acta Gyn , 7, 243, 1956
2 Brentand Fung and Moricard Bull Fed Soc Gyn et Obst , 4, 546, 1952
3 Davis C H and Grand C G Am J Obst and Gyn , 64, 544, 1952
4 Donald Ian B M J , 2, 1223, 1952
5 Feo L F Am J Obst & Gyn , 65, 1330, 1953
6 Gardener H L and Dukes C D Obst & Gyn , 8, 591, 1956
7 Gellhorn G J A M A , 100, 1765, 1933
8 Greenblatt & Barfield Am J Obst and Gyn , 62, 423, 1951

glucose-saline started by drip and she was put up for laparotomy at 4 p.m the same day

On opening the peritoneal cavity a big collection of fresh blood was seen This blood was collected in citrated bottles and strained through sterile gauze pieces and 500 c c of auto-transfusion was given Plenty of clots were removed from peritoneal cavity mostly from the pouch of Douglas Uterus and adnexa were explored and found to be in a normal healthy state except that the uterus was slightly bulky All other abdominal organs were examined and no source of bleeding could be located Once again pelvis was explored and it was found that there was filling of the pouch of Douglas with fresh blood So the uterus was retracted anteriorly when a ragged tear about 1" in diameter was found over the posterior vaginal wall near its junction with the cervix There were two bleeding points over this area from where the bleeding was rather brisk the tear did not seem to be communicating with the vagina so whole of the collection of blood was in the peritoneal cavity The tear was repaired with fine catgut sutures after ligating the bleeding vessels

Post Operatively She had an uneventful recovery and on further examination on the 20th day after operation uterus was found to be about 8 weeks size and soft in consistency Thus she was diagnosed to be a case of early intrauterine pregnancy as well.

Summary

A very rare case has been presented in which post-coital injury to the vagina, simulated ruptured ectopic gestation The cause for this severe type of injury seems to be forceful coitus in pregnancy when vagina is more vascular and tissues are more friable and bleed rather profusely

I wish to thank Dr (Mrs) M K Lokre, M.D , Professor of Obst & Gynaecology, and the Principal, Gandhi Medical College, Bhopal for allowing me to publish this case

POST-COITAL VAGINAL TEAR SIMULATING RUPTURED ECTOPIC GESTATION

by

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and
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Though post-coital tears leading to slight or moderately revealed haemorrhage are common, it is very rare for such a tear to cause severe intraperitoneal haemorrhage, so it is worth while reporting this case

Mrs S B, aged 25 years, was admitted on 15-7-60, at 2-40 p m with a history of acute pain in abdomen since 5 a m the same day The pain was continuous and severe in whole of the abdomen, with a maximum intensity in the lower abdomen She also complained of retention of urine since that morning

She gave history of 1¼ months' amenorrhoea The bowels moved normally that morning but she felt a desire to pass motion the whole day There was no history of bleeding per vaginam On asking leading questions regarding the onset of pain she stated that the pain started after she strained at stools But after the operation the patient admitted that the pain started immediately after the coitus which was against her wishes, so the husband had used force for the act

Menstrual History $\frac{7\text{-}8}{30}$

Obstetric History 5 full-term normal deliveries, all died in infancy and childhood, last labour was 10 months back

On Examination She was found to be restless due to the abdominal pain She was pale and poorly nourished Pulse was of a fair volume and tension with a rate of 80/min, Respiration rate 22/min, temp 97 8, blood pressure 120/80, heart and lungs were normal Per abdomen, there was slight fullness of the flanks Abdomen was tender to touch all over with maximum tenderness over the hypogastric region She resented palpation due to pain There was no rigidity of abdominal muscles Shifting dullness was present Bowel sounds were normal

As she did not allow proper examination she was given ethyl chloride Under anaesthesia, the findings were per abdomen, same as above, no mass was palpable Per vaginam, cervix was downwards and backwards External os was closed Uterus was slightly bulky and pushed forwards, it was mobile There was fullness in the pouch of Douglas Lateral fornices were clear Blood-stained discharge was seen on examining fingers

Per Speculum Vagina and cervix looked healthy no blue discolouration of mucosa Pinkish discharge was seen coming out per os

Provisional diagnosis was ruptured ectopic gestation

Laboratory Investigations Haemoglobin —56% Leucocytic count was within normal limits Urine-Normal

Management Bladder catheterized, 8 oz of clear urine drained Sedatives and antibiotics were given and intravenous

DIRECT PLACENTOGRAPHY

by

M G Varadharajan,

Government Hospital for Women and Children, Madras

The author investigated Reid's soft tissue technique for placentography using conventional roentgen-ray equipment The method relies on straight roentgenography with the fetus acting as a contrast medium The principle is based on the fact that the placenta occupies space and, where there is no space, there is, therefore, no placenta, provided there is space available for it In studying a patient suspected of placenta previa, an attempt is first made to show that there is no space between the presenting part and the brim of the pelvis, thereby excluding this diagnosis If there is space between the presenting part and the brim of the pelvis other conditions, such as a full bladder, full rectum, or soft tissue tumors, must be considered and excluded, if possible

The examination consists of taking an erect lateral roentgenogram of the pelvis and a lateral roentgenogram of the abdomen with the patient lying on the right side, supplemented, on occasions, by an antero-posterior spine roentgenogram and oblique roentgenograms, all made with a differential wedge filter over the tube aperture

The author distinguishes types of placenta previa, by location, as follows In Type I, the mass of the placenta is above the brim of the pelvis, with the margin dipping down into the pelvis slightly and displacing the presenting part In Type II, the mass of the placenta is at the brim with the margin usually not extending as far as the internal os In Type III, the mass of the placenta is slightly below the brim with the margin probably covering the internal os In Type IV, the mass of the placenta is in the pelvis Thus, this roentgenologic typing is determined by the position of the mass of the placenta, in contrast to the obstetric classifications which are determined by the position of the margin of the placenta Roentgenologic and clinical classifications, therefore, may not always agree, but the discrepancy should not be greater than one type The greatest difficulty will be experienced in discriminating between Type I and no placenta previa, and between Types II and III

The author concludes that the positive demonstration of placenta previa largely eliminates the need for diagnostic vaginal examination with its attendant risks It indicates whether caesarean section is preferable to vaginal delivery and frequently permits a diagnosis prior to the onset of bleeding The roentgenologic exclusion of placenta previa may be valuable in differentiating accidental haemorrhage from placenta previa

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Summary of Paper published in Punjab M J 9 263-278 Dec 1959

BOOK REVIEWS

MEDICAL SURGICAL & GYNAECOLOGICAL COMPLICATIONS OF PREGNANCY, Edited by Alan F Guttmacher M D and Joseph J Rovinsky M.D, Bailliere Tindall and Cox Ltd, London Pp 619 *Illustrations 90* Price 132/-

This comprehensive book is contributed by the staff of the Mount Sinai Hospital New York City, and is based on the experience gained from the ten Speciality Clinics created within the department of Obstetrics from the year 1952 when the department was first opened

The vast interplay between obstetrics and almost every other field of medicine and surgery is being increasingly recognised in view of the temporary alterations in physiology, metabolism and psychology which pregnancy gives rise to and which can often deteriorate into the pathological The creation of speciality clinics within the department of obstetrics is therefore a step in the right direction, in the better understanding and solving of the problems of medical surgical and gynaecological conditions associated with pregnancy

The contributors to this book are about 70 in number and all on the active staff of the hospital Their accumulated knowledge gained from these speciality clinics and augmented by wide reference to the literature should therefore be of the highest value, as a perusal of the book will show

The specialities dealt with are Cardiac Pulmonary, Hypertensive-renal, Diabetic Haematologic, Neurologic, Psychosomatic, Obstetric—Gynaecologic endocrine, Vaginitis and Varicose veins Each of the conditions, is dealt with from all aspects in relation to pregnancy Therapeutic measures are widely discussed, not only specific drug therapy but radiological endocrinal and dietetric and the possible induction of abortion and sterilisation The conduct of labour and mode of delivery is outlined whereever necessary

The book has deep value not only for the obstetric specialist but for the surgeon general practitioner, resident and internist. Considering the wide range of conditions dealt with it should prove a very useful book especially for ready reference, but it is not meant to replace the many standard text-books on obstetrics

D M S

GREENHILL-OBSTETRICS New (12th) Edition, Pp 1098 with 903 Illustrations, W B Saunders Company Ltd. Philadelphia & London. Price $17 00 (£ 5 19 0)

It is a pleasure to receive another edition of this very famous book on "Obstetrics", the original text of which was written by J B DeLee The last five editions have been edited, written and supervised by Greenhill and in this final form it is

The subcutaneous fat, surrounding the fetus, casts an important black line which is helpful in differentiating the broad, crescent soft tissue shadow of the placenta Hydramnios hinders placental recognition because its appearance may be identical in density Dipple and Brown advocated the lateral soft tissue roentgenogram as sufficient to show the placenta clearly in pregnancy of twenty-four weeks or more Vaughan introduced the wedge filter to equalize the roentgenographic density in 1942 using a plastic screen Other workers developed copper and aluminium filters

With the direct placentography method, about ninety per cent of normal and low implantations are on the anterior and posterior uterine walls, rather equally divided, while the remainder are chiefly fundal or previas Of 70 cases of placenta previa reported by Stevenson, 23 were associated with transverse and oblique fetal presentations D Lindsay and Davidson concluded that soft tissue roentgenography of the placenta was accurate in pregnancy of thirty-two weeks or over

From a review of the literature plus the experience with 132 of his own patients who were roentgenographed for vaginal bleeding during pregnancy, the author recommends soft tissue roentgenography as the most accurate and efficient method for the diagnosis of Types II, III or IV placenta previa He feels that the roentgenologic findings may be uncertain in Type I placenta previa, or in the presence of malpresentation, hydramnios, a small or deformed fetus, fibroid tumor, multiple pregnancy, and in cases of lateral placental implantation

the vagina proper throw the delicate neuroendocrine mechanism out of balance, impairing the uterine response to the hormonal stimuli In case of cervical adhesions and stricture surgical treatment is necessary

There are about fourteen articles written in German and French Script and therefore could not be reviewed

The title ("Symposium on Prenatal Care") seems to be inappropriate in view of the fact, that subjects like male and female infertility and artificial insemination have been included in this book. The book will be useful for research workers and post-graduates

J N K.

undoubtedly one of the best books on the subject The interesting feature of the present edition is that although the theme of DeLee's original book is still maintained, yet there is a beautiful blending of all the modern advances in obstetric science and classical time-honoured teachings in obstetric practice This is what imparts to it the honour of being a text as well as a reference book at the same time The introduction of new collaborators in specialised branches of obstetrics, like physiology of placenta, nutriton, endocrines, roentgenology and various associated disorders of pregnancy, to name but a few, has increased the value of the book to a considerable extent The claim made by the author that the book has been brought up to date is well merited The recent advances which have been incorporated in the book are those that have received confirmation and are recognised and accepted The most pleasant aspect of the book is that it holds up the teachings of conservative obstetric practice without its bigotry The writing and style are so pleasant that it is hard to put the book down until the end of the chapter has come

In the opinion of the reviewer, printer's devils like figure 481 printed as figure 471 only increases the attractiveness of the book by preventing an overperfectness in its composition It is recommended for all reference libraries and is as valuable an aid to consultants of today as its previous editions have been in the past All connected with the production of the book deserve to be congratulated

C M

SYMPOSIUM ON "PRENATAL CARE"—(PAGES 472) Published by P Noordhoff, Ltd, Groningen, The Netherlands

This book is a collection of papers and discussions presented at the Symposium held at Groningen—Rotterdam (June-1-6-1959)

It deals with various methods like Fluorometry, Colorimetry or bio-assay, etc for estimation of oestrogen, which could be useful clinically in cases like menstrual disorders, toxaemia of pregnancy, abortions, determination of ovulation, proper timing for induction of labour. This chapter on oestrogen is mainly technical and research-minded readers will find it interesting

Diabetes with pregnancy has been discussed in detail It has been stressed that maternal hypercorticism may be responsible for foetal overgrowth and anomalies

There are various other chapters in which thyroid function during pregnancy, anoxia of the foetus, organisation of prenatal care, adrenal function during pregnancy, sterility have been discussed The discussions given at the end of each chapter are very interesting

The "Uterine' traumatic Syndrome has been vividly illustrated by X'Ray pictures Ashermann has collected 250 cases of corporal adhesions and over 100 cases of cervical adhesions in the course of 10 years He advocates surgical treatment only in case of total or near total obliteration or to patients who fail to proceed with pregnancy, inspite of conservative treatment He assumes that changes in the cervical canal or u

Obituary



Born March 1911 Died February 1961

Dr Siva Prasanna Misra, M B, F R C O G, Professor of Obstetrics and Gynaecology, R G Kar Medical College, Calcutta, and Treasurer, Bengal Obstetric and Gynaecological Society, passed away on February 17, 1961, at the age of 50 years only

Obtaining M B Degree in 1935 from the Carmichael Medical College (now R G Kar Medical College) he worked as House Staff in Sir Kedarnath Das Maternity and passed M R C O G examination in 1939 Thereafter he became the Resident Suregon, Dy Visiting Surgeon, Visiting Surgeon and Associate Professor and subsequently Professor in his own institution He was made F R C O G in 1953

Dr Misra was a very popular figure in Calcutta, widely known for his extensive practice, simple habits, unassuming manners and charming amiable personality He was facile in photography and artistic drawings Inspite of being busy in professional affairs, he was a member of the Executive Committee of the Bengal Obstetric and Gynaecological Society, a member of the Indian Medical Association, Calcutta Medical Club, etc He was also a good social worker, having done extensive field work during riots and communal disturbances as a Staff Officer of Relief and Welfare Ambulance Corps His literary contributions are varied and numerous

Leaving behind his old parents, wife, brothers, sisters and two sons and host of friends, admirers, students and patients to mourn his premature death is shocking to all

May his soul rest in peace!

T B

quaffing a drink compounded of the juice of the tender and unripe palmyrah fruit, sugar-cane juice and tender-coconut water (Puram.24:10-16). Toṇṭi with its groves by the sea, was redolent of honey from the garlands that adorned Kōtai-mārpaṉ, the wreath worn by the women of the Cēra king and the *neytal* blooming in the backwaters (Puram.48.1-4) Aricil Kiḻār said to Pēkaṉ: May your horses be harnessed to your chariot so that, your wife grieving at your neglect may again become cheerful, and wear fragrant wreaths, her tresses fed with odorous incense, this is the only gift I ask of you" (Puram.146·5-11) The heroine accompanied by her bevy of maidens climbed up the dune and played on the sands, in the grove by the sea (Akam 180:1-3). The maid said to the heroine· "Our lord embracing your bosom adorned with garlands of variegated flowers, was pleasant, but that was before he left you, in order to seek wealth making your collyrium-fed eyes swim in tears and your complexion pale and sallow" (Kuru.339.3-7). The heroine became withered and lustreless like an unused garland, as the hero missed his tryst with her because of some obstacle(Naṟ.11 1,2). Wearing a fine wreath of Kaḷimulli flowers haunted by bees, the heroine with her companions bathed in the sea (Nar.245 2-4) As a boy, the hero smashed with his legs the toy-house made by the heroine, cut off the wreath adorning her hair and snatched away the ball she was playing with, besides doing may other mischievous pranks (Kali.51.1-4) The hero's chest grew soft in close contact with the fragrant garlands of the hetaerae, happy after their amorous union with him (Kali 72:19,20). Flaunting the marks made by the bangles of his paramour on his body, the hero came to his own house, making his wife pale and withered like wreaths worn on the hair (Kali.78: 21,22). People avoided bathing in the river Vaikai as it lost its charm because of the discarded flowers of the garlands of the men and the wreaths of women that floated on its waters (Pari 6:46-49)

2. *Cēraṉ* (Cera king)
Kaṭumāṉ Kōtai, the Cēra monarch Kuṭṭuvan Kōtai, had a limitless munificence that put to shame the very sky, his country protected by his sturdy hands, was inaccessible to enemy kings, like the terrain haunted by a tiger, dreaded by the shepherd with his flock (Puram.54). The court of the Cēra monarch adorned with bright and tender leaf of the palmyrah, with the player-minstrels blessing him for his bounty, was noisy with the sound of disputations by learned scholars in the presence of the king (Matu 523-526) The hero returning home after successfully completing his enterprise, said to his heart: "We shall embrace our beloved again and again, as many times as there are sands in the water-front of the Porunai River, at Karuvūr, of the Cēra king with fierce tuskers and tall chariots" (Akam 93:20-23)

3 *Pūnkottu* (Bunch of Flowers)
As the bunch of closely-set flowers of the *kaṭampa* tree shed its pollen resembling cochineal insects on the ground, the water-front looked pretty as a picture (Ciru.69-71)

4. *Kūntal* (Tresses of hair)
The heroine had lovely tresses adorned with the cluster of bright Ceruntı flowers, that looked like closely-set golden flowers (Akam.280.1,2).

Kōtai Mārpaṉ - *Cēra Vēntaṉ* (Cera Monarch)
Also known as Cēramāṉ Kōkkōtai Mārpan, he is the subject of two poems by the poet Poykaiyār (Puram.48,49) He was celebrated for his bounteousness. His city of Toṇṭi was redolent with honey from variegated flowers of the groves by the sea. When the people guarding the millet-fields beat upon their instruments to chase parrots away, the birds from the fields nearby, and the seashore adjacent, rose into the air together. The poet Poykaiyār says, it will be difficult to call him either the Lord of the hill, or lord of the town or lord of the coast as *Kuṟiñci*, *Marutam* and *Neytal* tracts were all in his territory. Nakkīrar's poem (Akam.346) refers to this king as a friend of Killivalavaṉ.

Kōpam - *Tampalap Pūcci* (Cochineal-insect)
The hero returning home after successfully completing his work said to his charioteer: "Drive fast the chariot, its wheels pressing deep into the ground, red with cochineal insects pretty as a picure, after the rain-cloud had discharged its showers" (Akam.54:2-6).

Kōmakaḷ - *Aracaṉmakaḷ* (The king's daughter/Princess)
Water-lily flowers bending before the fierce wind, bowed before the lotus flower, like a bevy of maidens begging for mercy with folded hands before an angry princess adorned with radiant bracelets (Nar.300:1-4).

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The younger brother of a certain soldier killed by an enemy-warrior the day before, searched for the latter with his eyes rolling like crab's-eye seeds rolling in a bowl, like one searching for a dipper to scoop out well-brewed toddy from a jar in the village (Puram:300.2-6).

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When Peruñcēral Irumporai and his queen came out of their palace and gave away to the poet Aricilkiḻār everything in the palace, together with nine hundred thousand pieces of gold and the kingship of the land, the poet refusing to accept it begged him to rule the country as before and served him as his minister (Pati pa 8 footnote).

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Kōviṉam - *Pacuvınam* (Cows)
The maid pointing out to the heroine, a certain youth taking part in the bull-fight said· "Is not yonder lad a herdsman of cows, the one who having leapt upon the bull with a mark, is lying on it as if he is pushing a boat into the sea?" (Kalı.103·36-38).

Kōvūr Kiḻār - *Pulavar* (A poet)
Known by his village called Kōvūr and his occupation, this poet's given name is not known Seventeen were the poems composed by him, fifteen in *Puṟanāṉūṟu* (31,32,33,41,44,45,46,47,68, 70,308,373,382,386,400), one in *Kuṟuntokai* (65) and one in *Naṟṟiṇai* (393). Cōḻa monarchs like, Nalaṅkiḷḷi, his brother Māvalattāṉ, Kāriyāṟṟut tuñciya Netuṅkilli, Kulamuṟṟattut tuñciya killivalavan and Kurāp pallit tuñciya kiḷḷivalavaṉ In Puram (70) he has sung about Pannaṉ and his Cirukuti Puram (31) describes the panic of the northern kings on hearing about the impending invasion of the north by Cōḻan Nalankilli. In Puram (41) the poet has described effectively the agitation of the men in the enemy terrtiories who fondly kissed their children's eyes, concealing their own dismay and fear on hearing about the invasion of their lands by Cōḻaṉ Kulamuṟṟattu Tuñciyakiḷḷi valavaṉ. The poet Kōvūr kiḻār was respected by all kings So much so, he was able to mediate successfully between Nalankilli who once besieged Uṟaiyūr and Netuṅkiḷḷi who had shut himself up inside the city. The poet's courage in resisting injustice can be seen in poem (46) which refers to his saving the children of Malayamāṉ, when Cōḻaṉ Kulammuṟṟattu Tuñciya Killivalavaṉ ordered them to be killed under an elephant's legs and in Puram (47)which refers to his saving the life of a poet called Ilantattaṉ of the court of Nalaṅkilli, when Neṭuṅkiḷḷi ordered him to be killed as a spy. The poet was well-versed in many subjects and known for his courage, wisdom and nobility

Kōvē - 1.*Vēntē* (Vocative for king)
Kuṟuṅkōḻiyūr Kiḻār praised Māntarañ Cēral Irumpoṟai addressing him as a king of the western people who gave limitlessly all things to all men (Puram.17.40).Vaiyāvik Kōpperum Pēkaṉ was hailed as of 'King of the Aviyar Clan(Puram:147.9). Palyāṉai Celkelu Kuṭṭuvaṉ and Ilañ cēral Irumpoṟai were addressed as "kings of the Pūḻiyar" (Pati.21· 23). Ilañcēral Irumpoṟai was addressed in two places as 'King of the Koṅkars' (Pati 88.19). Paṇṭiyaṉ Talaiyālaṅkāṉattu Ceruveṉṟa Neṭuñceḻiyaṉ when he conquered Kutta nāṭu was hailed as the victorious king who conquered the many Kuṭṭuvars (Matu.105).

2 *Vēṭkōvē* (*Kuyavaṉē*) (Oh Potter)
Poets addressed the potter as 'Vēṭkōvē' 'as one who made pots' (Puram.228·1,4)

Kovēṅkaip Peruṅkatavaṉār - *Pulavar* (A poet)
Kuṟuntokai (134) is the only poem in him name. Dr.U.Ve.Ca. taking his name to be Kōvēṅkaip perunkataḻvar" tries to explain it from the description of a cataract attacking a *vēṅkai* tree, found in his poem. V P's. edition has it only as Perun Katavaṉār.M.A D.conjectures that 'Katavaṉ' might refer to a deity at the door. In the poem, the heroine is languishing at the separation from her lover who had gone away to earn wealth for their marriage. The life-giving cataract rolling down the mountain, falling upon a *vēṅkai* tree dislodges its flowers and looks like a snake as it rolls over the stones The implied meaning is that the friendship of the hero, though beneficial at the end,causes much pain to the heroine till then

Kōvai - *Vaṭam* (chain)
The son of the heroine wore a spotless red coralstring over a golden chain inlaid with gems around his waist (Kalı 85 3,4) As the bodies of the women of Maturai who sported in the Vaikai swelled in joy, the pearls falling off revealing the string, the floods of the river broke their bounds of modesty (Pari.6:15,21).

Kōḷ - 1 *Koḻumai* (Fat/plump)
Fishermen who were chieftains of the south, ate

be seen, nor the sound of churning curds could be heard from houses (Puram.257.8-13).

5. *Kōtpīlu* (Belief)
Bees buzzing at the jumbo fruit mistaking it to be one of their own kind, a crab believing it to be a fruit seized it; at which the bees powerless against the crab, hummed like *yāḻ*-music (Nar. 35 2-5).

6 *Nāṉmīṉ* (Planet)
Imayavarampaṉ Neṭuñcēralātaṉ was hailed as a radiant king with the combined brightness of the stars, the sun, the moon and the other planets, and also fire (Pati 14:3-4)

7. *Maṉattār Kuṟittuk Koḷḷutal* (Make mental note)
The lord of the hills looked often at the colly-rium-fed eyes of the heroine and left: gazing after his retreating figure in the evening, she said to the maid admiringly "Friend! This is a man if ever there was one! Intelligent persons like you should make a mental note of such things and come to the correct conclusions". Thus the maid indirectly revealed to the foster-mother the truth of the heroine's love for the hero (Akam 48 21-26)

8. *Kaṭaip Piṭittal* (Following/Observing)
The lord of Karumpaṉur followed great principles which could not be ignored by others (Puram. 381:25,26).

9. *Cempāmpu* (Red snake)
The ornament adorning the heads of women haunted by bees resembled the crescent-moon being swallowed by the red snake (Puram.383-385)

10 *Vakai* (Kind)
Kulamuṟṟattu tuñciya Kiḷḷivalavaṉ was addressed as "the lord with his chest adorned with many kinds of flower-garlands (Puram 397:7,8)

11 *Paḻuttal* (Ripening)
The minstrels tied together their drums and instruments like the *ākuḷi*, all in a bundle which looked like a bunch of jack-fruit ripening in the rainy season (Malai:3-13).

12 *Kūṟṟam* (Death)
The *varāl* fish gobbled up the bait which became its death (Akam.36:1,2)

13. *Koḷḷutal* (Filling up) The white pod of the plump bean-vine became ripe for picking (Puram. 120:10-11)

Kōḷālar - *Erukoḷḷa Vallār*
The hero standing in the midst of the relatives of the heroine proudly declared that there was no bull-fighter like him capable of vaquishing a bull (Kali.101.43,44).

Kōḷi - *Pūvāmal Kāykkum Maram* (A tree that bears fruit without flowering)
The thick branches of the stout-stemmed banyan tree which bore fruit without flowering, were supportted by its aerial roots (Puram 58.2,3) Of the trees that bear fruit without flowering, the jackfruit is the greatest by virtue of its sweetness (Peru.407,408).

Kōḷiyūrkiḻār Makaṉār Celiyaṉār - *Pulavar* (A poet)
This poet Celiyaṉar might have been the son of an agriculturist in Kōḷiyūr village. Au D. opinse that the place should have been in Pāṇṭiya country considering, the name 'Celiyaṉ'. In *Naṟṟiṇai* 383 the only poem composed by him, the maid urges the hero to expedite his marriage with the heroine pointing out the hazards on his way to the tryst by night: "You have no concern for the heroine, as you come by the track where the tiger roars after killing the tusker for relieving the hunger of its mate that had recently littered while the thunderbolt cuts to pieces the snakes in the way". The poet's fancy is seen in his comparison of a striped tiger-cub to a wreath of *vēṅkai* flowers

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Kau

Kautamaṉār - *Pulavar* (A poet)
See Kōtamaṉār, Pālaik Kautamaṉār

Kauvai - 1. *Alar* (Gossip)
The maid grieving at the distress of the heroine said: "Gone are the days when the chariot of the hero, used to frequently stay for long hours by our house, even in broad daylight in spite of the gossip of cruel-tongued women and the danger from the sharks in the backwaters" (Akam.50.1-6). The maid said to the heroine: "Not minding the gossip of the people of the hamlet, where the glory-lily blooms, let us tomorrow happily sport in the rain-water cascading down the high hill, with the hero's chest as a float, till our dark eyes become red" (Akam 312:4-8) The heroine asked her maid: "Is it just because the hero pitying my crimson fingers plucked the sedge and made a doll for me, that you are also repeating the harsh words of the gossipping women of the village without checking their truth?" (Kali.76: 6-10). Weakening passion and gossip distressed the heroine like two heavy weights carried by her on a pole across her shoulder (Kali.142:56-58).

2 *Olittal* (Sounding)
At dawn the young fawn would nibble at the tender leaves of the common-millet growing on the high ground (Kuru.282:1-3)

3 *Āravāram* (Noise/Bustle)
The gossip that arose when the hero met his paramour in the grove was greater than the noise made by the black *kuyil* upon the long bough of the *kuravam* tree in midsummer (Aink.369)

4 *Varuttam* (Pain)
The maid said to the heroine: "May the pain of your sleeping alone disappear as my lord has come to wed you, let the village rejoice at this glad tidings" (Kuru 34)

5 *Ilankāy* (Tender unripe fruit)
After the heavy rain, the tender unripe pods of the sesame becoming full and black, grew so thick that only seven of them with oil inside, could be grasped in one hand (Malai 103-106).



Tamil name	Common name	Botanical name
Iṇṭu/Iṇṭai	Eight-pinnate soap-pod	*Acacia intsia caesia*
Iratti/Ilantai	Jujube	*Zizyphus jujuba*
Iravam	Iron-wood	*Zizyphus mauritiana*
Iruppai	Mahua	*Bassia longifolia*
Iruvātci/Kokuṭi	Tuscan jasmine	*Jasminum sambac*
Illam/Tēṟṟamaram	Clearing-nut tree	*Strychnos potatorum*
Ilañci/Makiḻam/Vakulam	Ape-flower tree	*Mimusops elengi*
Ilantai	Jujube	*Zizyphus jujuba*
Ilavam/Ilavu	Silk-cotton	*Bombax malabaricum*
Īṅkai	A sensitive plant	*Mimosa rubicaulis*
Ittu/Intu	Date-palm	*Phoenix dactylifera*
Ukā/Ukāy	Toothbrush tree	*Salvadora persica*
Uṭai	Umbrella thorn/babul	*Acacia planifrons*
Untāḻ/Perumūṅkil	Bamboo	*Bambusa arundinacea*
Uyavai/Kākkanāṅkoṭi	Mussel-shell creeper	*Clitoria Ternatea*
Ulavai/Vēlamaram	Buffalo-thorn tree	*Acacia planifrons*
Uḻiñcil/Vākai	Sirissa	*Albizzia lebbeck*
Uḻiñai	Balloon-vine	*Cardiospermum halicacabum*
Uḻuntu	Black gram	*Phaseolus mungoglaber/vigna*
Uḷḷi	Onion	*Allium cepa*
Uṉṉam	Omen tree/Black babul	*Albizzia nilotica*
Ūkam/Ūku	Broomstick grass	*Aristida setacea*
Erinakai/Veṭci	Scarlet ixora	*Ixora coccinea*
Erukkam	Madar	*Calotropis gigantea*
Eruvai		
1. *Korukkacci*	A kind of reed	*Arundo donax*
2. *Paiñcāy kōrai*	A kind of grass	*Cyperus rotandus tuberosus*
Eruḻam	A hill tree	*Rhododendron nilagiricum*
Eḷ	Sesame	*Sesamum indicum*
Eḻilaippālai	Seven-leaved milk tree	*Alstonia scholaris*

Kōviṉam - *Pacuvinam* (Cows)
The maid pointing out to the heroine, a certain youth taking part in the bull-fight said· "Is not yonder lad a herdsman of cows, the one who having leapt upon the bull with a mark, is lying on it as if he is pushing a boat into the sea?" (Kali.103·36-38).

Kōvūr Kiḻār - *Pulavar* (A poet)
Known by his village called Kōvūr and his occupation, this poet's given name is not known Seventeen were the poems composed by him, fifteen in *Puranāṉūru* (31,32,33,41,44,45,46,47,68, 70,308,373,382,386,400), one in *Kuruntokai* (65) and one in *Narrinai* (393). Cōḻa monarchs like, Nalaṅkiḷḷi, his brother Māvalattāṉ, Kāriyārrut tuñciya Netuṅkilli, Kulamurrattut tuñciya killivalavan and Kurāp pallit tuñciya kiḷḷivalavaṉ In Puram (70) he has sung about Pannaṉ and his Cirukuti Puram (31) describes the panic of the northern kings on hearing about the impending invasion of the north by Cōḻan Nalankilli. In Puram (41) the poet has described effectively the agitation of the men in the enemy terrtiories who fondly kissed their children's eyes, concealing their own dismay and fear on hearing about the invasion of their lands by Cōḻaṉ Kulamurrattu Tuñciyakiḷḷi valavaṉ. The poet Kōvūr kiḻār was respected by all kings So much so, he was able to mediate successfully between Nalankilli who once besieged Uraiyūr and Netuṅkiḷḷi who had shut himself up inside the city. The poet's courage in resisting injustice can be seen in poem (46) which refers to his saving the children of Malayamāṉ, when Cōḻaṉ Kulammurrattu Tuñciya Killivalavaṉ ordered them to be killed under an elephant's legs and in Puram (47)which refers to his saving the life of a poet called Ilantattaṉ of the court of Nalaṅkilli, when Neṭuṅkiḷḷi ordered him to be killed as a spy. The poet was well-versed in many subjects and known for his courage, wisdom and nobility

Kōvē - 1.*Vēntē* (Vocative for king)
Kuruṅkōḻiyūr Kiḻār praised Māntarañ Cēral Irumporai addressing him as a king of the western people who gave limitlessly all things to all men (Puram.17.40).Vaiyāvik Kōpperum Pēkaṉ was hailed as of'King of the Aviyar Clan(Puram:147.9).Palyāṉai Celkelu Kuṭṭuvaṉ and Ilañ cēral Irumporai were addressed as "kings of the Pūḻiyar" (Pati.21·23). Ilañcēral Irumporai was addressed in two places as 'King of the Koṅkars' (Pati 88.19). Paṇṭiyaṉ Talaiyālaṅkāṉattu Ceruveṉra Neṭuñceḻiyaṉ when he conquered Kutta nāṭu was hailed as the victorious king who conquered the many Kuṭṭuvars (Matu.105).

2 *Vēlkōvē* (*Kuyavaṉē*) (Oh Potter)
Poets addressed the potter as 'Vēṭkōvē' 'as one who made pots' (Puram.228·1,4)

Kovēṅkaip Peruṅkatavaṉār - *Pulavar* (A poet)
Kuruntokai (134) is the only poem in him name. Dr.U.Ve.Ca. taking his name to be Kōvēnkaip perunkataḻvar" tries to explain it from the description of a cataract attacking a *vēṅkai* tree, found in his poem. V P's. edition has it only as Perun Katavaṉār.M.A D.conjectures that 'Katavaṉ' might refer to a deity at the door. In the poem, the heroine is languishing at the separation from her lover who had gone away to earn wealth for their marriage. The life-giving cataract rolling down the mountain, falling upon a *vēnkai* tree dislodges its flowers and looks like a snake as it rolls over the stones The implied meaning is that the friendship of the hero, though beneficial at the end,causes much pain to the heroine till then

Kōvai - *Vaṭam* (chain)
The son of the heroine wore a spotless red coral-string over a golden chain inlaid with gems around his waist (Kali 85 3,4) As the bodies of the women of Maturai who sported in the Vaikai swelled in joy, the pearls falling off revealing the string, the floods of the river broke their bounds of modesty (Pari.6:15,21).

Kōḷ - 1 *Koḻumai* (Fat/plump)
Fishermen who were chieftains of the south, ate

Tamil name	Common name	Botanical name
Kaḻimulli	A thorny flower-plant	*Acanthus illicifolius*
Kaḻai/kilai	Bamboo	*Bambusa arundinacea*
Kaḷḷi	Spurge plant (Milk-hedge plant)	*Euphorbia Tirucalli*
Kalā	Whortle-berry	*Vaccinium Nilghierense*
Kākkanānkoti	Mussel-shell creeper	*Clitoria ternatea*
Kāñci	River-Portia tree	*Triwia nudiflora*
Kāntal	Glory-lily	*Gloriosa superba*
Kāmpu/Mūnkil	Bamboo	*Bambusa arundinacea*
Kāyā/Pūvai	Bilberry	*Memecylon edule*
Kārai	Thorny shrub	*Canthium parviflorum*
Kāvi	Red water-lily	*Nymphaea stellata*
Kāḻvai/Akil	Eagle-wood	*Aquilaria agallocha*
Kāḷāṉ	Mushroom	*Agaricus Campestris*
Kitai	Sola pith	*Aeschynomene indica*
Kumiḻam	Cashmere tree	*Gmelina asiatica*
Kurali	A kind of creeper	—
Kuravam/ Kurā	Common bottle-flower	*Atlantea missionis*
Kurukkatti/Kuruku/Mātavi	Common delight of the woods	*Heptage madablota*
Kuruntam	Wild lime	*Atlantea racemosa*
Kullai	Wild basil	*Ocimum canum*
Kuvaḷai	Blue-lily/ Nelumbo	*Nymphaea nouchalia*
Kuḷavi	Wild jasmine	*Jasminum griffithii*
Kuriñci	Cone-head	*Strobilanthes kunthianus*
Kuṉṟimaṇi	Crab's-eye seed	*Abrus precatoris*
Kūtāḷam	Convolvulus	*Ipomoea sepiaria*
Kūntalpaṉai	Talipot	*Corypha umbraculifera*
Kūviram/Kūviḷam	Bael tree	*Aegle marmelos*
Kūvaikkiḻanku	East Indian arrowroot	*Curcuma angustifolia*
Kaitai/Tāḻai	Fragrant screw-pine	*Pandanus tectorius*
Kokku/Māmaram	Mango	*Mangifera indica*

Tamil name	Common name	Botanical name
Ñemai/Ñemaiyam	A kind of tree	—
Tatavu/Tatā	A kind of tree	—
Tantāṅkōrai	A kind of sedge	*Cyperus rotundus tuberosus*
Tanakku	Whirling-nut tree	*Gyrocarpus jacquini*
Tamālakkoli	Mysore gamboge	*Garcinia Xanthochymus*
Taruppai	Sacred grass	*Saccharum spontaneum*
Tāmarai/Kamalam	Lotus	*Nelumbium speciosum*
Tāḻai	Fragrant screw-pine	*Pandanus odoratissimus*
Tāḻippaṉai	Talipot	*Corypha umbraculifera*
Tillai	Blinding tree/Tiger's milk tree	*Excoecaria agallocha*
Tilakam	Barbadoes, pride	*Adenanthera pavonina*
Tiṉai	Millet	*Setaria italica*
Tuḷari/Totari	A species of jujube	*Zizyphus rugosa*
Tumpai	White dead-nettle	*Leucas aspera*
Tuḻāy/Tulavam	Sacred basil	*Ocimum sanctum*
Tenku/Teṉṉai	Coconut tree	*Cocos nucifera*
Teruḻ	A wild creeper	—
Tēṟṟu/Tēṟṟā	Clearing-nut tree	*Strychnos potatorum*
Tōṉṟi	Red glory-lily	*Gloriosa superba*
Nanti/Nantiyāvattai	East Indian rosebay	*Ervatamia coronaria*
Narantam pul	Lemon-grass	*Cymbopogon citratus*
Narantam pū	Bitter-orange	*Citrus medica*
Nallirul nāṟi	Tuscan-jasmine	*Jasminum sambac florae*
Naliṉam/Tāmarai	Lotus	*Nelumbium speciosum*
Naṟavam/Naṟā/Naṟai	A fragrant creeper	*Bixa orellana*
Naṟai	Nutmeg tree	*Myristica fragrans*
Nākam/ Curapuṉṉai/ Vaḻai/ Puṉṉākam	Gamboge	*Ochrocarpus longifolius*
Nāṇal	Reed	*Sachaarum spontaneum*

be seen, nor the sound of churning curds could be heard from houses (Puram.257.8-13).

5. *Kōṭpāṭu* (Belief)
Bees buzzing at the jumbo fruit mistaking it to be one of their own kind, a crab believing it to be a fruit seized it; at which the bees powerless against the crab, hummed like *yāḻ*-music (Nar. 35 2-5).

6 *Nāṉmīṉ* (Planet)
Imayavarampaṉ Neṭuñcēralātaṉ was hailed as a radiant king with the combined brightness of the stars, the sun, the moon and the other planets, and also fire (Pati 14·3-4)

7. *Maṉattāṟ Kuṟittuk Koḷḷutal* (Make mental note)
The lord of the hills looked often at the colly-rium-fed eyes of the heroine and left: gazing after his retreating figure in the evening, she said to the maid admiringly "Friend! This is a man if ever there was one! Intelligent persons like you should make a mental note of such things and come to the correct conclusions". Thus the maid indirectly revealed to the foster-mother the truth of the heroine's love for the hero (Akam 48 21-26)

8. *Kaṭaip Piṭittal* (Following/Observing)
The lord of Karumpaṉur followed great principles which could not be ignored by others (Puram. 381:25,26).

9. *Cempāmpu* (Red snake)
The ornament adorning the heads of women haunted by bees resembled the crescent-moon being swallowed by the red snake (Puram.383-385)

10 *Vakai* (Kind)
Kulamuṟṟattu tuñciya Kiḷḷivaḷavaṉ was addressed as "the lord with his chest adorned with many kinds of flower-garlands (Puram 397:7,8)

11 *Paḻuttal* (Ripening)
The minstrels tied together their drums and instruments like the *ākuḷi*, all in a bundle which looked like a bunch of jack-fruit ripening in the rainy season (Malai:3-13).

12 *Kūṟṟam* (Death)
The *varāl* fish gobbled up the bait which became its death (Akam.36:1,2)

13. *Koḷḷutal* (Filling up) The white pod of the plump bean-vine became ripe for picking (Puram. 120·10-11)

Kōḷāḷar - *Eṟukoḷḷa Vallār*
The hero standing in the midst of the relatives of the heroine proudly declared that there was no bull-fighter like him capable of vaquishing a bull (Kali.101.43,44).

Kōḷi - *Pūvāmal Kāykkum Maram* (A tree that bears fruit without flowering)
The thick branches of the stout-stemmed banyan tree which bore fruit without flowering, were supportted by its aerial roots (Puram 58.2,3) Of the trees that bear fruit without flowering, the jackfruit is the greatest by virtue of its sweetness (Peru.407,408).

Kōḷiyūrkiḻār Makaṉār Ceḻiyaṉār - *Pulavar* (A poet)
This poet Ceḻiyaṉar might have been the son of an agriculturist in Kōḷiyūr village. Au D. opinse that the place should have been in Pāṇṭiya country considering, the name 'Ceḻiyaṉ'. In *Naṟṟiṇai* 383 the only poem composed by him, the maid urges the hero to expedite his marriage with the heroine pointing out the hazards on his way to the tryst by night: "You have no concern for the heroine, as you come by the track where the tiger roars after killing the tusker for relieving the hunger of its mate that had recently littered while the thunderbolt cuts to pieces the snakes in the way". The poet's fancy is seen in his comparison of a striped tiger-cub to a wreath of *vēṅkai* flowers

Kōṉ - *Aracaṉ* (King)
Ālattūr Kiḻār eulogised Cōḻaṉ Kuḷamuṟṟatut Tuñciya Kiḷḷi Valavaṉ thus. "If I do not sing your praise

Tamil name	Common name	Botanical name
Pittikam	Jasmine	*Jasminum grandiflorum*
Pirantai	Square-stalked vine	*Vitis quadrangularis*
Pirampu	Cane vine/rattan vine	*Calamus rotang*
Pirkku	Sponge-gourd ribbed gourd	*Luffa aegyptica*
Pulimā	Bilimbi tree	*Averrhoa bilimbi*
Puṉku	Indian beech	*Pongamia glabra*
Puṉṉai	Alexandrian laurel	*Calophyllum inophyllum*
Puṉali	Wild jasmine	*Jasminum angustifolium*
Pūvaracu	Portia tree	*Thespesia populnea*
Pūvai/Kāyā	Bilberry	*Memecylon edule*
Pūḷai	Wool plant	*Aerva tomentosa*
Pōnkam	A kind of red-wood	*Adenanthera*
Mañcal	Turmeric	*Curcuma longa*
Makiḻam/Vakulam	Ape-flower tree	*Mimusops elengi*
Maral	Bow-string hemp	*Sanseviera roxburghiana*
Maravam	Indian oak	*Anthocephalus indicus*
Marutam	Queen's flower tree	*Terminalia arjuna*
Mā/Kokku	Mango	*Mangifera indica*
Milaku	Pepper	*Piper nigrum*
Mucuntai	Leather-berried bind-weed	*Rivea ornata*
Muntakam/Tāmarai	Lotus	*Nelumbium speciosum*
Puracu/Palācam/Puḻaku	Flame of the forest	*Butea frondosa*
Mullai	Jasmine	*Jasminum auriculatum*
Mulmurunkai/Murukku/Kavir	East Indian coral-tree	*Erythrina indica*
Mūnkil	Bamboo	*Bambusa arundinacea*
Mauval	Wild jasmine	*Jasminum sessiflorum*
Yāmaram	Ya tree	—
Vakulam	Ape-flower tree	*Mimusops elengi*
Vañci	Indian willow	*Salix tetrasperma*

LIST OF ANIMALS

Acunam	A legendary sensitive animal which likes good music, considered to be a bird also
Arā/Aravu	Snake
Alavan/Kuliṟu/Ñentu	Crab
Ā/Āmā/Āmaṉ	Wild-cow
Āmāṉpukalvi	Wild-bull
Āmai	Turtle/tortoise
Āli/Yāli	Leophant
Itankar/Mutalai	A kind of crocodile
Iralai/Kalai	Stag
Umpal/Kaliṟu/Kōttumā/Vēḻam	Elephant
Uḻuvai/Kuyavari	Tiger
Uḻai/Nauvi	Deer
Uḻiyam/Enku	Bear
Ūkam/Katuvaṉ/Kalai/Mucu	Male monkey
Ekiṉam	1 Dog 2 Yak
Ey/Eymmāṉ	Porcupine
Ēḻakam/Mēḻam	Sheep
Ēnam	Pig
Ottakam	Camel
Ōnāṉ	Calote
Ōnti	Chameleon
Katamā	Wild-cow
Katamān/Katamai	Wild-deer
Katumā/Kalimā	Horse
Karām	Crocodile
Kāttu erumai	Wild-bison

Kau

Kautamaṉār - *Pulavar* (A poet)
See Kōtamaṉār, Pālaik Kautamaṉār

Kauvai - 1. *Alar* (Gossip)
The maid grieving at the distress of the heroine said: "Gone are the days when the chariot of the hero, used to frequently stay for long hours by our house, even in broad daylight in spite of the gossip of cruel-tongued women and the danger from the sharks in the backwaters" (Akam.50.1-6). The maid said to the heroine: "Not minding the gossip of the people of the hamlet, where the glory-lily blooms, let us tomorrow happily sport in the rain-water cascading down the high hill, with the hero's chest as a float, till our dark eyes become red" (Akam 312:4-8) The heroine asked her maid: "Is it just because the hero pitying my crimson fingers plucked the sedge and made a doll for me, that you are also repeating the harsh words of the gossipping women of the village without checking their truth?" (Kali.76: 6-10). Weakening passion and gossip distressed the heroine like two heavy weights carried by her on a pole across her shoulder (Kali.142:56-58).

2 *Olittal* (Sounding)
At dawn the young fawn would nibble at the tender leaves of the common-millet growing on the high ground (Kuru.282:1-3)

3 *Āravāram* (Noise/Bustle)
The gossip that arose when the hero met his paramour in the grove was greater than the noise made by the black *kuyil* upon the long bough of the *kuravam* tree in midsummer (Aink.369)

4 *Varuttam* (Pain)
The maid said to the heroine: "May the pain of your sleeping alone disappear as my lord has come to wed you, let the village rejoice at this glad tidings" (Kuru 34)

5 *Ilaṅkāy* (Tender unripe fruit)
After the heavy rain, the tender unripe pods of the sesame becoming full and black, grew so thick that only seven of them with oil inside, could be grasped in one hand (Malai 103-106).



LIST OF BIRDS

Aṉṟil	A bird reputed for its constancy in love
Aṉṉam/Ōtimam	Swan
Ital/cival	Partridge
Uvaṇam/Garuḍaṉ	White-headed kite
Eruvai/Paruntu/Pokuval	Vulture
Eḷāl/Pullūṟu	Falcon
Kanantul	Lapwing
Kampūtcēval	A kind of water-fowl
Kāṉavāraṇam/Kāṉaṅkōḻi	Grey jungle fowl/wood-cock
Kiḷḷai/kiḷi	Parrot
Kiṉṉaram	A song-bird
Kuñcaraakkuru alakaruki	Adjutant-stork
Kuṭiñai	Great horned-owl
Kuyil	Koel, a song-bird
Kurāl/Kūkai	Barn-owl
Kurīi/kuruvi	Sparrow
Kuruku	Heron
Kurumpūḻ/Kāḷai/Ikai	Quail
Kokku	Crane
Ciral/Ciccili	Kingfisher
Cevvari	Red-streaked stork
Tūkkaṇāṅkuruvi	Weaver-bird
Tūtuṉampuṟavu	A kind of dove
Nārai	Stork
Nīrkkōḻi	Water-fowl
Puṟā/Puṟavu	Dove
Pūvai	Starling
Makaṉṟil	Aquatic love-bird
Maññai/Tōkai	Peacock
Vaṅkā	Vanga bird

NAMES OF MUSICAL INSTRUMENTS

Ākuli	A small drum
Āmpal	Musical pipe with a handle in the shape of a water-lily
Ellari	Kind of drum
Orukanmākkinai	One-headed drum
Kañcatālam	Cymbals
Karatikaipparai	A drum, sounding like the growling of a bear
Kinai	Kettle - drum
Kuḻal	Flute
Kulir	Contrivance for scaring parrots away
Kompu	Horn
Tattai	Bull-roarer
Tatāri	A kind of drum, of the agricultural tract
Tannumai	A large drum
Tuti	A drum shaped like an hour-glass; a tabret
Tontakapparai	A small drum used in the hill tract
Patalai	Broad-headed large drum
Pampai	A kind of tabor of the maritime tract
Panṟipparai	Pot-shaped drum for scaring away wild hogs
Muḻavu	Large loud-sounding drum
Yāḻ	Stringed instrument, resembling a lute
Ciriyāḻ	Small lute

Tamil name	Common name	Botanical name
Inṭu/Intai	Eight-pinnate soap-pod	*Acacia intsia caesia*
Iratti/Ilantai	Jujube	*Zizyphus jujuba*
Iravam	Iron-wood	*Zizyphus mauritiana*
Iruppai	Mahua	*Bassia longifolia*
Iruvātci/Kokuti	Tuscan jasmine	*Jasminum sambac*
Illam/Tēṟṟamaram	Clearing-nut tree	*Strychnos potatorum*
Ilañci/Makiḻam/Vakulam	Ape-flower tree	*Mimusops elengi*
Ilantai	Jujube	*Zizyphus jujuba*
Ilavam/Ilavu	Silk-cotton	*Bombax malabaricum*
Īnkai	A sensitive plant	*Mimosa rubicaulis*
Īttu/Īntu	Date-palm	*Phoenix dactylifera*
Ukā/Ukāy	Toothbrush tree	*Salvadora persica*
Utai	Umbrella thorn/babul	*Acacia planifrons*
Untāḻ/Perumūnkil	Bamboo	*Bambusa arundinacea*
Uyavai/Kākkanāṅkoṭi	Mussel-shell creeper	*Clitoria Ternatea*
Ulavai/Vēlamaram	Buffalo-thorn tree	*Acacia planifrons*
Uḻiñcil/Vākai	Sirissa	*Albizzia lebbeck*
Uḻiñai	Balloon-vine	*Cardiospermum halicacabum*
Uḻuntu	Black gram	*Phaseolus mungoglaber/vigna*
Uḷḷi	Onion	*Allium cepa*
Uṉṉam	Omen tree/Black babul	*Albizzia nilotica*
Ūkam/Ūku	Broomstick grass	*Aristida setacea*
Erinakai/Veṭci	Scarlet ixora	*Ixora coccinea*
Erukkam	Madar	*Calotropis gigantea*
Eruvai		
1. *Korukkacci*	A kind of reed	*Arundo donax*
2 *Paiñcāy kōrai*	A kind of grass	*Cyperus rotandus tuberosus*
Eruḷam	A hill tree	*Rhododendron nilagiricum*
Eḷ	Sesame	*Sesamum indicum*
Eḻilaipipālai	Seven-leaved milk tree	*Alstonia scholaris*

MYTHOLOGICAL NAMES

Aswiṉi Devas	Twin Gods of medicine
Acuras	Demons
Arjuṉa	The third of the Pāṇtava Brothers
Aruntati	Sage Vasishta's wife, an exemplar of chastity
Aticcētaṉ	Ādisesha, the thousand-headed serpent on whom Vishnu reclines
Indraṉ	Lord Indra, the king of the celestials
Kaṇṇaṉ	Lord Krishna, the eighth Avatar of Lord Vishnu
Garudaṉ	The great eagle-mount of Lord Vishnu
Kētu	One of the nine planets, according to the Hindu astrology (The descending node)
Korravai	The Goddess of Victory, Durga
Kauravas	The Hundred brothers of the Kuru clan, mortally opposed to the five Pantavas
Chandraṉ/Tinkal	The Moon-God
Cani	The planet Saturn
Cevvāy	The planet Mars
Civā	Lord Civa, the Destroyer God of the Hindu triad
Sūrya	The Sun God
Dharmar	Dharmaputra, eldest of the Pantavas
Dēvas	Celestial Gods
Dēvacēnai	Daughter of Lord Indra, Wife of Lord Murukan
Tirumakaḷ	Goddess of wealth, Lakshmi
Tirumāl	Lord Vishnu, the Preserver God of the Hindu triad
Baladēvaṉ/Balarāmaṉ	Elder brother of Lord Krishna
Bhīmā	Second of Pantava heroes
Budhā	The planet Mercury
Brahmā	The God of Creation
Pāntavas	The five sons of Pantu, opposed by the hundred Kauravas

LIST OF LITERARY TERMS

Term	Meaning
Akam	One of the two broad thematic divisions of Cankam classics dealing with love
Atiyōr pānkiṉ Talaivaṉ	Servitor-hero
Atiyōr pānkiṉ Talaivi	Servitor-heroine
Ampāvātal/ Taimnīrātal	Ceremonial bathing of maidens in the month of *Tai*
Allakuri	Mistaking something else as the lover's trysting sign
Arattotu nirral	Revelation of the heroine's true and virtuous love for the hero
Ākamam	(Agamas) A class of sacred works in Sanskrit
Āyam	Bevy of maids attending on the heroine
Ārruppatuttal	Directing/ guiding minstrels on their way to a patron
Itantalaippātu	The hero meeting his beloved in the very place where he first met her the day before
Iravukkuri	The trysting place outside the house fixed for the heroine's clandestine meeting with the hero, during the night
Iyarpatamoḻital	Speaking in praise of the hero's noble qualities
Iyaṟpaḻittal	Speaking in disparagement of the hero's true nature
Irceríppu	The nubile heroine being confined to her parental house, indirectly preventing her from meeting her lover
Irparattai	Concubine of the hero faithful to him
Erumaimaram	The theme of the hero taking a bold stand against his foes, though the rest of the army had retreated
Erutaḻuvutal	A herdsman fighting with fierce bulls and over-coming them in order to win the hand of his lady--love.
Uḻiñai	Theme describing the besieging of a fort
Ūtal	Lovers tiff/ sulking/bouderie
Ūraṉ	Lord of a *Marutam* tract

Tamil name	Common name	Botanical name
Kaḻimulli	A thorny flower-plant	*Acanthus ilicifolius*
Kaḻai/kilai	Bamboo	*Bambus arundinacea*
Kaḷḷi	Spurge plant (Milk-hedge plant)	*Euphorbia Tirucalli*
Kalā	Whortle-berry	*Vaccinium Nilghierense*
Kākkanānkoti	Mussel-shell creeper	*Clitoria ternatea*
Kāñci	River-Portia tree	*Trewia nudiflora*
Kāntal	Glory-lily	*Gloriosa superba*
Kāmpu/Mūnkil	Bamboo	*Bambusa arundinacea*
Kāyā/Pūvai	Bilberry	*Memecylon edule*
Kārai	Thorny shrub	*Canthium parviflorum*
Kāvi	Red water-lily	*Nymphaea stellata*
Kāḻvai/Akil	Eagle-wood	*Aquilaria agallocha*
Kāḷāṉ	Mushroom	*Agaricus Campestris*
Kitai	Sola pith	*Aeschynomene indica*
Kumiḻam	Cashmere tree	*Gmelina asiatica*
Kurali	A kind of creeper	—
Kuravam/ Kurā	Common bottle-flower	*Atlantea missionis*
Kurukkatti/Kuruku/Mātavi	Common delight of the woods	*Heptage madablota*
Kuruntam	Wild lime	*Atlantea racemosa*
Kullai	Wild basil	*Ocimum canum*
Kuvalai	Blue-lily/ Nelumbo	*Nymphaea nouchalia*
Kuḻavi	Wild jasmine	*Jasminum griffithii*
Kuriñci	Cone-head	*Strobilanthes kunthianus*
Kuṉrimaṇi	Crab's-eye seed	*Abrus precatoris*
Kūtāḻam	Convolvulus	*Ipomoea sepiaria*
Kūntalpaṉai	Talipot	*Corypha umbraculifera*
Kūviram/Kūvilam	Bael tree	*Aegle marmelos*
Kūvaikkiḻanku	East Indian arrowroot	*Curcuma angustifolia*
Kaitai/Tāḻai	Fragrant screw-pine	*Pandanus tectorius*
Kokku/Māmaram	Mango	*Mangifera indica*

Talaivan̲	Hero of a love poem/ husband/ chieftain
Talaivi	Heroine of a love poem/ wife
Tal̲iñci	Theme describing the presents given by the king to his wounded soldiers after the battle
Titti	Spreading golden spots on a woman's body
Titalai	Golden beauty spots upon the heroine's body
Tiṇai	General division of theme in Cankam poetry
Tun̲ankai	Kind of dance where the dancer strikes his sides with his bent arms
Tumpai	Theme of fierce battle between two great monarchs adorned with (dead-white nettle) *tumpai* flowers
Turai	Subject/theme in *akam*, *puram* poetry
Turaivan̲	Lord of the ford
Toyyil	The lovely designs drawn upon the bosom and arms of the heroine with sandal-wood paste
Natukal	Stone erected to commemorate a dead hero
Nayappupparattai	The newest paramour of the hero
Nātan̲	Lord of the land
Neytal	Sea and littoral tract
Pakarkuri	The trysting place fixed for the hero's secret meeting with his beloved during day-time
Pacalai	The pale sallowness of complexion caused in the heroine, owing to separation from the hero
Paṭaimatam	The theme, describing the violation of the laws of war
Parattai	Courtesan/hetaera/harlot/the hero's paramour
Pal̲iccutal	Extolling the hero
Pānkan̲	Companion of the hero
Pātān	Theme of eulogising the hero's greatness
Pāṇan̲	Minstrel
Pāntarankam	Lord Civa's dance after destroying the triple cities

Vākai	Theme describing the celebration of a victorious king wearing sirissa flowers
Vāyil	Envoys mediating between sulking lovers
Viricci kēttal	Listening to the auspicious words of an invisible speaker
Viṟali	Danseuse, minstrel's wife
Vinaivala pānkiṉ Talaivaṉ	Hero of the artisan class
Vinaivala pānkiṉ Talaivi	Heroine of the artisan class
Vinaivayir pirital	Theme describing the separation of the hero from his beloved as he goes on his king's work
Vetci	Theme describing the seizing of cattle from the enemy by warriors wearing *vetci* flowers
Veṟiyātal	Frenzied dance by a sooth-sayer while invoking Lord Murukaṉ
Vēlan	The sooth-sayer praising Lord Murukaṉ
Vēli	A land measure of about 6 74 acres

Tamil name	Common name	Botanical name
Ñemai/Ñemaiyam	A kind of tree	—
Tulavu/Talā	A kind of tree	—
Tantāṅkōrai	A kind of sedge	*Cyperus rotundus tuberosus*
Taṇakku	Whirling-nut tree	*Gyrocarpus jacquini*
Tamālakkoti	Mysore gamboge	*Garcinia Xanthochymus*
Taruppai	Sacred grass	*Saccharum spontaneum*
Tāmarai/Kamalam	Lotus	*Nelumbium speciosum*
Tāḻai	Fragrant screw-pine	*Pandanus odoratissimus*
Tālippaṉai	Talipot	*Corypha umbraculifera*
Tillai	Blinding tree/Tiger's milk tree	*Excoecaria agallocha*
Tilakam	Barbadoes, pride	*Adenanthera pavonina*
Tiṉai	Millet	*Setaria italica*
Tuḷari/Totari	A species of jujube	*Zizyphus rugosa*
Tumpai	White dead-nettle	*Leucas aspera*
Tuḻāy/Tulavam	Sacred basil	*Ocimum sanctum*
Tenku/Teṉṉai	Coconut tree	*Cocos nucifera*
Teruḻ	A wild creeper	—
Tēṟṟu/Tēṟṟā	Clearing-nut tree	*Strychnos potatorum*
Tōṉṟi	Red glory-lily	*Gloriosa superba*
Nanti/Nantiyāvattai	East Indian rosebay	*Ervatamia coronaria*
Narantam pul	Lemon-grass	*Cymbopogon citratus*
Narantam pū	Bitter-orange	*Citrus medica*
Nallirul nāṟi	Tuscan-jasmine	*Jasminum sambac florae*
Naliṉam/Tāmarai	Lotus	*Nelumbium speciosum*
Naṟavam/Naṟā/Naṟai	A fragrant creeper	*Bixa orellana*
Naṟai	Nutmeg tree	*Myristica fragrans*
Nākam/ Curapuṉṉai/ Vaḻai/ Puṉṉākam	Gamboge	*Ochrocarpus longifolius*
Nāṇal	Reed	*Sachaarum spontaneum*

Page No.	Column No.	Line No	Error	Correction
155	1	43	exuda	exude
172	2	23	Celvakkṭuankō	Celvakkaṭunkō
175	2	21	*Itikkuru*	*Itikkum*
177	1	33	strnegth	Strength
182	1	9	flower shaunted	flowers, haunted
193	2	24	culogised	eulogised
195	1	17	the twyfold earth	the immense earth
197	1	10	fluffly	fluffy
201	2	37	commonsence	commonsense
213	1	30	become	became
216	2	18	Eti-kutir	Etirkutir
217	2	29	coasta	coastal
227	1	28	jungle-cat at	jungle-cat hunting for rats at
227	1	41	rebuest	request
229	2	29	night	right
262	2	19	even if does	even if he does
273	1	36	Kaṭṭēval	Kaṭṭēral
274	2	26	threw	knew
278	1	3	for	from
285	2	27	months,, gestation	months' gestation
288	1	22	and became	and become
293	1	16	of the Kōpperuñcoḻan	of Kōpperuñcōḻan
296	1	40	maledy	malady
300	2	35	*Aṉpiṉai*	*Ampiṉai*
305	1	36	dwelts	dwelt
307	2	32	lighting	lightning
318	2	30	withe	wither
318	2	34	deseating	defeating
326	1	11	Grieve	Grief
328	1	29	(Pari 39.50,53)	(Pari 19:50,53)
329	1	1	blace	place
332	2	36	was	were

Page No.	Column No.	Line No.	Error	Correction
404	1	30	swound	wounds
408	1	7	grinding)	grinding-stone)
414	1	8	the horus of	the horns of
416	2	14	blesh	flesh
417	1	31	and heaved	heaved
420	2	3	song of	sang of
423	1	24	delighted and in	and delighted in
449	2	37	cheif	chief
449	2	39	Banddits	Bandits
450	1	25	*Vaṉkaṇmaikal*	*Vaṉkaṇmaikal* (Cruelties) See Kotumai
450	2	12	adapt	adept
451	1	24	favoar	favour
451	2	26	(Aakm 10.8-12)	(Akam.10 8-12)
454	2	33	maid by reveals	maid reveals
456	1	26	low-caved	low-eaved
457	2	6	fied	field
459	1	39	commended	commenced
462	2	9	covered with his	covered it with her
463	1	30	sounds	sands
463	2	26	heroine is	heroine is
471	2	27	others, words	others' words
472	1	32	may	many
475	1	36	his with	with his
476	1	4	wayfaing	wayfaring
476	1	40	waying	swaying
476	2	1	satisfieds	satisfied
476	2	35	suiftly	swiftly
477	2	11	world	would
478	2	4	as of king	as King
478	2		[illegible] him name	his name,
480	[illegible]			opines
495				*Miñiṟu*

Tamil name	Common name	Botanical name
Pittikam	Jasmine	*Jasminum grandiflorum*
Pirantai	Square-stalked vine	*Vitis quadrangularis*
Pirampu	Cane vine/rattan vine	*Calamus rotang*
Pīrkku	Sponge-gourd ribbed gourd	*Luffa aegyptica*
Pulimā	Bilimbi tree	*Averrhoa bilimbi*
Puṉku	Indian beech	*Pongamia glabra*
Puṉṉai	Alexandrian laurel	*Calophyllum inophyllum*
Puṉali	Wild jasmine	*Jasminum angustifolium*
Pūvaracu	Portia tree	*Thespesia populnea*
Pūvai/Kāyā	Bilberry	*Memecylon edule*
Pūḷai	Wool plant	*Aerva tomentosa*
Pōnkam	A kind of red-wood	*Adenanthera*
Mañcal	Turmeric	*Curcuma longa*
Makiḻam/Vakulam	Ape-flower tree	*Mimusops elengi*
Maral	Bow-string hemp	*Sanseviera roxburghiana*
Maravam	Indian oak	*Anthocephalus indicus*
Marutam	Queen's flower tree	*Terminalia arjuna*
Mā/Kokku	Mango	*Mangifera indica*
Milaku	Pepper	*Piper nigrum*
Mucuntai	Leather-berried bind-weed	*Rivea ornata*
Muntakam/Tāmarai	Lotus	*Nelumbium speciosum*
Puracu/Palācam/Puḻaku	Flame of the forest	*Butea frondosa*
Mullai	Jasmine	*Jasminum auriculatum*
Mulmurunkai/Murukku/Kavi	East Indian coral-tree	*Erythrina indica*
Mūnkil	Bamboo	*Bambusa arundinacea*
Mauval	Wild jasmine	*Jasminum sessiflorum*
Yāmaram	Ya tree	—
Vakulam	Ape-flower tree	*Mimusops elengi*
Vañci	Indian willow	*Salix tetrasperma*